



Interconnection Feasibility/System Impact Study Report Request # GI-2011-02

200 MW Wind Turbine Generation
Near Limon, Colorado

Public Service Company of Colorado
Transmission Planning
January 19, 2012

A. Executive Summary

Public Service Company of Colorado (PSCo) received an interconnection request (GI-2011-02) for a 200 MW wind turbine generation facility to be located approximately 6 miles north of Limon, Colorado. The interconnection request was received March 9, 2011.

The wind generation facility will consist of 125 1.6 MW GE xle wind turbine generators with Zero Voltage Ride Through (ZVRT) capability and GE's WindFree option for supplying or absorbing reactive power below the wind cut-off speed. This facility will interconnect with the PSCo transmission system at the proposed Missile Site 345 kV substation (the Point Of Interconnection) via a Customer owned 40 mile 345 kV line (see Figures 1 & 2 below). The requested in-service date is December 31, 2012. Therefore, the studies examined system performance for 2013 heavy summer conditions.

The request was studied as a stand-alone project only, without including other new generation interconnection requests that may exist in the Large Generator Interconnection Request (LGIR) queue, but including the generation interconnection projects that are already planned to be in service by December 31, 2012. The main purpose of this Feasibility/System Impact Study was to evaluate the potential impact on the PSCo transmission infrastructure as well as that of neighboring utilities when injecting the additional 200 MW of generation at the proposed Missile Site 345 kV substation, and delivering the additional generation to native PSCo loads.

This request was studied as a Network Resource Interconnection Service and an Energy Resource Interconnection Service. These investigations included power flow, short circuit, and dynamic stability analyses. These analyses included both NERC Category B and NERC Category C contingencies.

The results of the Category B contingency power flow thermal studies for 2013 heavy summer analyses showed no overloads that could be attributed to the proposed wind plant. The voltage analysis also showed no problems due to the wind plant.



The results of the PSCo Category C contingency thermal analysis showed one PSCo overloaded line that could be attributed to the proposed wind plant. However, the emergency rating of this line should allow for transmission operator system adjustments to relieve the overload. The voltage analysis also showed no problems.

In addition, the short circuit analysis showed no new over-dutied circuit breakers due to the installation of the proposed wind farm.

The transient stability study determined that the system remains stable during and after each contingency studied and all system oscillations display positive damping such that oscillations decrease quickly. For all of the contingencies studied, there was no tripping of wind turbines either with or without the proposed GI-2011-2.

Network Resource Interconnection Service (NRIS)

Since the analyses found no thermal, voltage, short circuit, or stability problems that could be attributed to the proposed wind plant, the Network Resource Interconnection Service was not restricted: Therefore,

NRIS = 200 MW

Note that PSCo is planning to be able to accommodate the December 31, 2012 requested in service date.

Energy Resource Interconnection Service (ERIS)

Since the analyses found no thermal, voltage, short circuit, or stability problems that could be attributed to the proposed wind plant, the Energy Resource Interconnection Service was not restricted: Therefore,

ERIS = 200 MW

Also, non-firm transmission capability may be available depending upon generation dispatch levels, demand levels, WECC Major Path import levels (TOT 3, TOT 7, etc.), and the operational status of transmission facilities

Figure 1 Missile Site Substation and Surrounding Transmission System

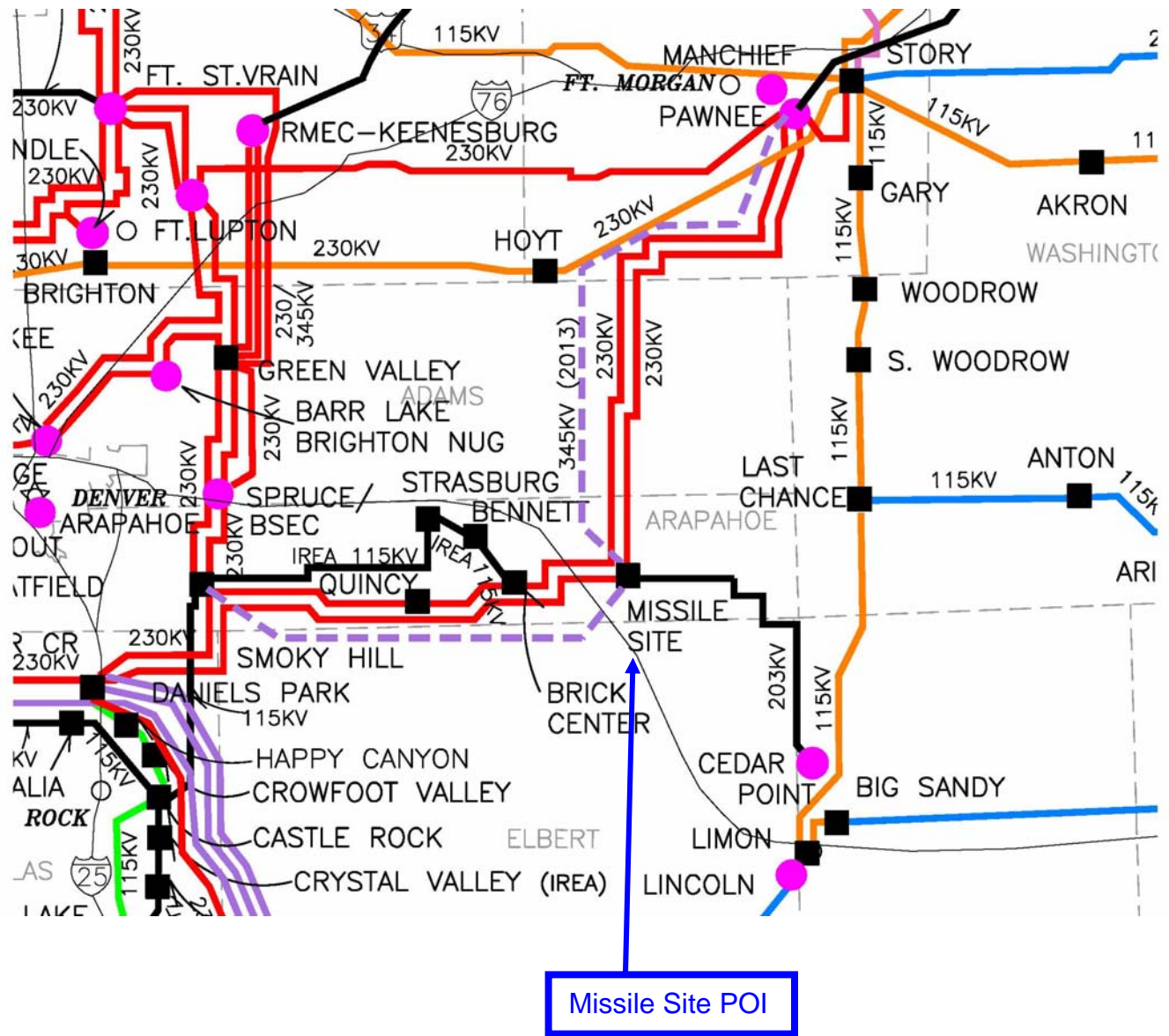
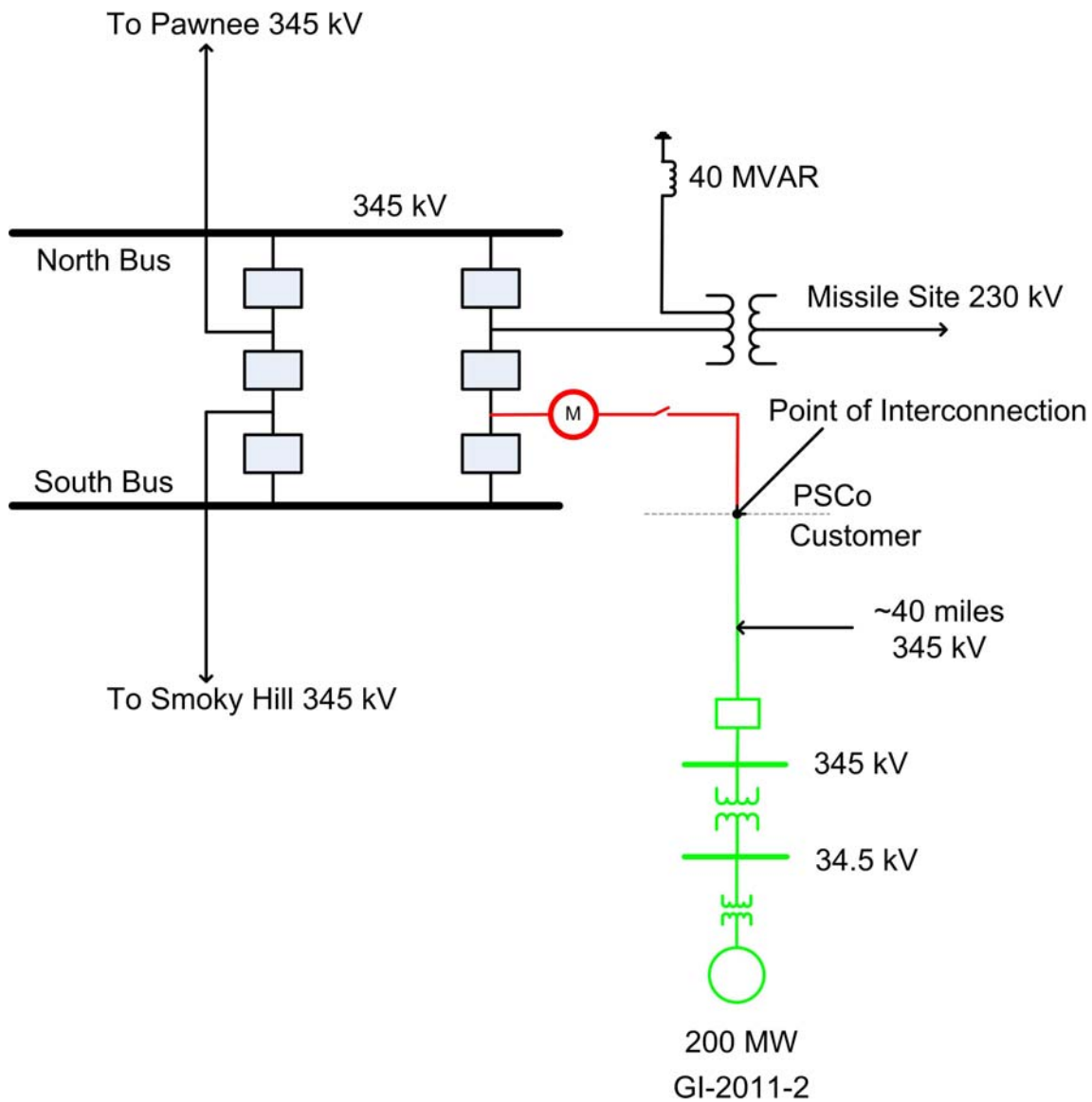


Figure 2: GI-2011-2 Conceptual Diagram



	PSCo Planned System
	Customer Equipment
	PSCo Owned Equipment, Customer Funded



B. Introduction

Public Service Company of Colorado (PSCo) received an interconnection request (GI-2011-02) for a 200 MW wind turbine generation facility to be located approximately 6 miles north of Limon, Colorado. The interconnection request was received March 9, 2011.

The wind generation facility will consist of 125 1.6 MW GE xle wind turbine generators with Zero Voltage Ride Through (ZVRT) capability and GE's WindFree option for supplying or absorbing reactive power below the wind cut-off speed. This facility will interconnect with the PSCo system at the proposed Missile Site 345 kV substation (the Point Of Interconnection) via a Customer owned 40 mile 345 kV line (see Figures 1 & 2 above). The requested in-service date is December 31, 2012. Therefore, the studies examined system performance for 2013 heavy summer conditions.

C. Study Scope and Analysis

The Feasibility/System Impact Study evaluated the transmission impacts associated with the proposed wind farm. It consisted of power flow, short circuit, and dynamic analyses.

The power flow analysis identified any steady-state thermal or voltage limit violations resulting from the installation of the proposed wind farm and an identification of network upgrades required to deliver the proposed generation to PSCo loads. The transient stability analysis determined the response of the power system to system disturbances in the area around the POI.

PSCo adheres to NERC & WECC Reliability Criteria, as well as internal Company criteria for planning studies. During system intact conditions, criteria are to maintain transmission system bus voltages between 0.95 and 1.05 per unit of nominal, and steady-state power flows below the thermal ratings of all facilities. Operationally, PSCo tries to maintain a transmission system voltage profile ranging from 1.02 per unit or higher at regulating (generation) buses to 1.0 per unit or higher at transmission load buses. Following a single contingency, transmission system steady state bus voltages must remain within 0.90 per unit to 1.05 per unit, and power flows within 100% of the facilities' continuous thermal ratings.

This interconnection request was studied both as a Network Resource Interconnection Service (NRIS) and Energy Resource Interconnection Service (ERIS).

Network Resource Interconnection Service shall mean an Interconnection Service that allows the Interconnection Customer to integrate its Large Generating Facility with the Transmission Provider's Transmission System (1) in a manner comparable to that in which the Transmission Provider integrates its generating facilities to serve native load customers; or (2) in an RTO or ISO with market based congestion management, in the same manner as all other Network Resources. Network Resource Interconnection Service in and of itself does not convey transmission service.



Energy Resource Interconnection Service shall mean an Interconnection Service that allows the Interconnection Customer to connect its Generating Facility to the Transmission Provider's Transmission System to be eligible to deliver the Generating Facility's electric output using the existing firm or non-firm capacity of the Transmission Provider's Transmission System on an as available basis. Energy Resource Interconnection Service in and of itself does not convey transmission service.

For this project, there were no Affected Parties.

D. Power Flow Study Models

The power flow studies were based on the WECC approved 12HS3SAP case. PSCo loads in the case were adjusted to reflect the most recent (September 2011) PSCo load forecast. IREA load was also adjusted to reflect IREA's latest load forecast. The topology was also updated to reflect current project plans. Updates were included for the PSCo, IREA, CSU, TSG&T, WAPA, PRPA, BHE, and BEPC systems.

The PSCo updates included the addition of the Pawnee-Missile Site-Smoky Hill 345 kV circuit and addition of the Pawnee, Comanche and Daniels Park 345 kV 40 Mvar reactors. These reactors were modeled as normally out of service. The updates also included a more detailed representation of the existing Missile Site 230 kV wind farm, the new 230/115 kV, 280 MVA transformer #2 at Chambers, line ratings changes, and new distribution transformers at the Jewell 230 kV and Federal Heights 230 kV split substations. Additional updates were included for equipment changes further from the study area.

Two main power flow generation dispatch scenarios were evaluated. One was created as a reference scenario and the other was created with the proposed generation.

To assess the impact of the proposed generation on the transmission system, the generation levels were increased at the existing and planned PSCo-connected wind generating plants, including Peetz Logan (21% of max), Cedar Creek (21% of max), and Missile Site (77% of max). The PSCo thermal units were dispatched according to their relative generation costs. The resulting PSCo generation dispatch can be found in Appendix B.

The Area 70 (Area PSCOLORADO) swing machine in the WECC load flow case was moved to Comanche Unit 1. In addition, the flow through the TOT 3 interface was 1326.9 MW without the proposed generation and 1322.2 MW with the proposed generation. Also, the flow through the TOT 7 interface was 199.6 MW without the proposed generation and 212.2 MW with the proposed generation.

In the case with the proposed generation, the 200 MW of new wind turbine generation was added to the Missile Site 345 kV bus using modeling information provided by the customer.



This information was converted to a single generator equivalent that included the 345 kV line, 34.5/345 kV main step-up transformer, equivalent 34.5 kV collector system branch, and equivalent 0.69/34.5 kV generator step-up transformer. The main step-up transformer tap was set to the 345 kV tap and the generator step-up transformer was set to the 35.3625 kV (1.025 pu) tap. These taps are consistent with the data provided by the Customer. The reactive capability of the generators was set to +/-0.0 Mvar. The generation dispatch with the new wind farm can also be found in Appendix A.

E. Power Flow Study Process

Contingency power flow studies were completed on the reference model and the model with the proposed new generation using PTI's PSSE Ver. 32.1.0 and MUST Ver. 10.1 programs. Results from the two cases were compared and new overloads or overloads that increased significantly in the new generation case were noted. Voltage criteria violations were also recorded. MUST's contingency analysis activities were used to perform the load flow contingency analysis. The PSCo Category B & C analysis was performed using contingency definitions that reflect breaker to breaker outages. Single branch switching was also performed for branches in Zones 700, 703, 704, 706, 752, and 754 (central, north-central, northeast, and east-central Colorado). Single unit outages were also modeled for generators in Area 70. The facilities in Zones 700, 703, 704, 706, 752, and 754 were monitored for overloads and voltage problems.

F. Power Flow Thermal Results

The results of the Category B contingency analyses showed no facilities with overloads that could be attributed to the proposed wind plant.

The results of the Category C contingency analyses showed one facility with an overload that could be attributed to the proposed wind plant. The Coors Recycling-Ft Lupton 115 kV line was overloaded for the double circuit tower outage of the Isabelle-Ft St Vrain 230 kV and Valmont-Spindle 230 kV lines. This circuit was overloaded 101.9% of its 120 MVA summer rating (122.3 MVA or 614 A). This line is limited by the 600 A breaker switches and 300 MCM Cu jumpers at the Ft Lupton 115 kV substation.

The emergency rating for this circuit is 144 MVA due to the 300 MCM Cu jumpers at the Ft Lupton 115 kV substation. This is a 4 hour rating, so transmission operators should be able to alleviate the overload through transmission system sectionalizing and/or generation redispatch.

G. Voltage Regulation and Reactive Power Capability

Interconnection Customers are required to interconnect their Large Generating Facilities with Public Service of Colorado's (PSCo) Transmission System in conformance to the *Xcel*



Energy Interconnection Guidelines for Transmission Interconnected Producer-Owned Generation Greater Than 20 MW (available at <http://www.xcelenergy.com/staticfiles/xcel/Regulatory/Transmission-Interconnection-Guidelines-Great-20MW.pdf>). Wind generating plant interconnections must also conform to the performance requirements in FERC Order 661-A. Accordingly, the following voltage regulation and reactive power capability requirements (at the POI) are applicable to this interconnection request:

- To ensure reliable operation, all Generating Facilities interconnected to the PSCo transmission system should adhere to the Rocky Mountain Area Voltage Coordination Guidelines. Accordingly, since the POI for this interconnection request is located within Northeast Colorado Region 7; the applicable ideal transmission system voltage profile range is 1.02 – 1.03 per unit at regulated buses and 1.0 – 1.03 per unit at non-regulated buses.
- Xcel Energy's OATT requires all Interconnection Customers to have the reactive capability to achieve +/- 0.95 power factor at the POI, with the maximum "full output" reactive capability available at all output levels. Furthermore, Xcel Energy requires all Interconnection Customers to have dynamic voltage control and maintain the voltage specified by the Transmission Operator within the limitation of +/- 0.95 power factor at the POI, as long as the generating plant is on-line and producing power.
- It is the responsibility of the Interconnection Customer to determine the type (switched shunt capacitors and/or switched shunt reactors, etc.), the size (MVAR), and the locations (34.5 kV or 345 kV bus) of any additional static reactive power equipment needed within the generating plant in order to have the reactive capability to meet the +/- 0.95 power factor and the 1.02 – 1.03 per unit voltage range standards at the POI. Further, for wind generating plants to meet the LVRT performance requirements specified in FERC Order 661-A, appropriately sized and located reactive power compensation devices (capacitor, DVAR, SVC, etc.) may need to be installed within the generating plant.
- The Interconnection Customer is required to demonstrate to the satisfaction of PSCo Transmission Operations prior to the commercial in-service date of the generating plant that it can safely and reliably operate within the required power factor and voltage ranges (noted above).

This study examined the ability of the proposed wind plant to adhere to the power factor and reactive power requirements of the interconnection guidelines. The results of these studies indicate that with all wind turbine generators in service and generating the requested 200 MW maximum output, capacitors will not be required. The combined line charging from the 345 kV transmission line and 34.5 kV collector system will provide adequate reactive compensation to offset the reactive losses in the wind plant circuits resulting in near unity power factor at the Missile Site 345 kV station.

However, with all facilities in service but 0 MW of generation from the wind generators, there are approximately 49.6 Mvars of line charging injected at the Missile Site 345 kV



point of interconnection (POI) with the voltage at 1.035pu. This is equivalent to 46.3 Mvars at 1.000 pu voltage. Therefore, at least 46.3 Mvar of reactive absorption capability must be provided by the generating customer in order to compensate for the wind plant line charging to obtain Unity Power Factor at the Missile Site 345 kV POI

The Customer will need to perform additional studies to determine the capabilities, optimum location(s) and configuration(s) for the reactive compensation required to meet the +/- 0.95 power factor standard at the POI.

H. Dynamic Stability Analysis –Models

H.1 Modeling of Proposed Wind Generating Plant

GI-2011-2 is comprised of 125 GE 1.6 MW wind turbine generators (WTGs) equipped with Zero Voltage Ride-Through (ZVRT) capability. The proposed facility was modeled in detail with each GE WTG represented as individual generators. Each generator was modeled at 0.69 kV and connected through a generator step-up transformer to the 34.5 kV collector system. The 34.5 kV collector system at the GI-2011-2 site consists of 12 circuits connected to a 345/34.5 kV substation. All of these circuits were represented in detail. The wind farm is connected to the 345 kV bus at Missile Site through a 40 mile 345 kV transmission line. A 20 Mvar reactor was connected to the 34.5 kV bus of the main transformer at the proposed GI-2011-2 site and is modeled in-service in all of the simulations.

H.2 Modeling of Existing Wind Generating Plants

- Peetz Logan Wind Energy Plant (575 MW) – consists of GE 1.5 MW WTGs with LVRT 2 (Peetz Table and Logan), and GE 1.5 MW WTGs with ZVRT and Siemens SMK 2.03 2.3 MW WTGs with LVRT. The same models were used in this analysis as those used in the dynamic stability analysis for the GI-2006-2 project (Siemens PTI report R96-09, Peetz–Logan Wind Farm Expansion Request # GI-2006-2 Dynamic Analysis – Restudy with Siemens and GE WTGs, July 02, 2009.)
- Cedar Point Wind Energy Plant (250 MW) – consists of Vestas V90 1.80 MW WTGs with LVRT. This wind farm was modeled as GE 1.5 MW WTGs with LVRT 2 in the dynamic stability analysis. A 10 Mvar DSTATCOM was modeled at the collection feeder of this wind farm.
- Cedar Creek Wind Energy – Phase 1 (CCWE-1) Plant (300 MW) – consists of GE 1.5 MW WTGs with LVRT 2 and Mitsubishi WTGs. This wind farm was modeled with GE 1.5 MW WTGs with LVRT 2 in the dynamic stability analysis.
- Cedar Creek Wind Energy – Phase 2 (CCWE-2) Plant (250 MW) – consists of GE 1.5 MW WTGs with LVRT 2 and Nordex WTGs. This wind farm was modeled with GE 1.5 MW WTGs with LVRT 2 in the dynamic stability analysis.



Note that due to availability and/or data problems associated with proprietary models for certain manufacturer's wind turbines, the models used to represent the Cedar Creek and Cedar Point wind farms are standard models selected to be representative of the type of turbines installed at these wind farms.

I. Dynamic Stability Analysis – Results

The transient stability analysis determines the response of the power system to system disturbances such as the occurrences of faults, tripping of generator units, tripping of transmission lines or tripping of loads in the area around the POI. These studies evaluate generator frequency, generator rotor angles, bus voltages and power flows before, during and after a disturbance to determine if the system remains stable after the disturbance. In addition FERC 661A requires the wind powered generators to remain on-line during a disturbance up to the time periods and voltage levels set in the Low Voltage Ride-Through (LVRT) capability standard.

Transient stability analysis was performed for a number of three-phase faults and single line to ground faults near the GI-2011-2 including Missile Site 345 kV and Pawnee 230 kV, as shown in Table 6. Normal fault clearing times of 6 cycles for 230 kV facilities and 5 cycles for 345 kV facilities were used in this study. For each of these contingencies, a specified fault type was applied for the specified cycles and appropriate action was taken to clear the fault. This procedure was performed for both cases with and without the proposed generation. For the disturbances with breaker failure the clearing time considered was 20 cycles, and when simulating a protection system failure the considered clearing time was 21 cycles.

The results of the dynamic stability analysis, presented in Table 6, for the 2013 case indicate that the system remains stable during and after each contingency studied and all system oscillations damp out appropriately. For all of the contingencies studied, there was no tripping of wind turbines either with or without the proposed GI-2011-2.

J. Short Circuit

For the Customer proposed interconnection at the Missile Site 345 kV POI, no new circuit breakers on the PSCo system are expected to exceed their capabilities following installation of the new generation. The calculated short circuit parameters for the POI at the Missile Site 345 kV substation are shown in Table 1 below.

Please note that for the breaker duty calculations, the wind plant was modeled as a generator with an $X_d'' = 0.333$ pu at the 34.5 kV low side of the main 345/34.5 kV step up transformer.



Table 1 – Short Circuit Parameters at the Missile Site 345 kV POI

System Condition	Three-Phase Fault Level (Amps)	Single-Line-to-Ground Fault Level (Amps)	Thevenin System Equivalent Impedance (R +j X) (ohms)
All Facilities in Service w/ GI-2011-2	11315.6	9766.6	Z1(pos)= 1.24115 +j 17.5590 Z2(neg)= 1.26703 +j 17.5574 Z0(zero)= 4.10084 +j 25.7094
All Facilities in Service w/o GI-2011-2	10578.6	8797.22	Z1(pos)= 1.23416 +j 18.7886 Z2(neg)= 1.26379 +j 18.7871 Z0(zero)= 4.99399 +j 29.9356
Missile Site – Smoky Hill 345 kV out w/o GI-2011-2	6632.11	5508.86	Z1(pos)= 2.05546 +j 29.9632 Z2(neg)= 2.06487 +j 29.9732 Z0(zero)= 8.77847 +j 47.7660
Missile Site – Pawnee 345 kV out w/o GI-2011-2	7793.67	6816.82	Z1(pos)= 1.77746 +j 25.4955 Z2(neg)= 1.82110 +j 25.4856 Z0(zero)= 2.58331 +j 36.4600
Missile Site 345/230 kV Auto out w/o GI-2011-2	8188.80	6512.68	Z1(pos)= 1.50499 +j 24.2776 Z2(neg)= 1.54236 +j 24.2752 Z0(zero)= 8.45792 +j 42.4760



K. Costs Estimates and Assumptions

GI-2011-2 (Feasibility/System Impact Study Report)

October 6, 2011

Appropriation level cost estimates for Interconnection Facilities and Network/Infrastructure Upgrades for Delivery (+/- 20% accuracy) were developed by Xcel Energy/PSCo Engineering staff. The cost estimates are in 2011 dollars with escalation and contingencies applied (AFUDC is not included) and are based upon typical construction costs for previously performed similar construction. These estimated costs include all applicable labor and overheads associated with the engineering, design, material/equipment procurement and construction of these new PSCo facilities. This estimate does not include the cost for any other Customer owned equipment and associated design and engineering.

The estimated total cost for the required upgrades for is **\$3,970,000**. The figure in Appendix E below represents a conceptual one-line of the proposed expansion/interconnection at the Missile Site 345kV Substation. These estimates do not include costs for any other Customer owned equipment and associated design and engineering. The following tables list the improvements required to accommodate the interconnection and the delivery of the Project generation output. The cost responsibilities associated with these facilities shall be handled as per current FERC guidelines. System improvements are subject to change upon a more detailed and refined design.



Table 2 – PSCo Owned; Customer Funded Transmission Provider Interconnection Facilities

Element	Description	Cost Est. (Millions)
PSCo's Missile Site 345kV Transmission Substation	Interconnect Customer to the 345kV bus at the Missile Site Substation. The new equipment includes: <ul style="list-style-type: none"> • One 345kV, 3000 amp gang switch • Three 345kV metering CT's • Three 345kV metering CCVT's • Three 345kV lightning arresters • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures • Associated transmission line communications, fiber, relaying and testing. 	\$1.77
	Total Cost Estimate for PSCo-Owned, Customer-Funded Interconnection Facilities	\$1.77
Time Frame	Design, procure and construct	10 Months

Table 3: PSCo Owned; PSCo Funded Interconnection Network Facilities

Element	Description	Cost Estimate (Millions)
PSCo's Missile Site 345kV Transmission Substation	Interconnect Customer to the 345kV bus at the Missile Site Substation. The new equipment includes: <ul style="list-style-type: none"> • Three 345kV, 3000 amp circuit breakers • Four 345kV, 3000 amp gang switches • Associated station controls, communications, supervisory and SCADA equipment • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures • Associated equipment and system testing • Associated yard surfacing and fencing 	\$2.20
	Total Cost Estimate for PSCo-Owned, PSCo-Funded Interconnection Facilities	\$2.20
Time Frame	Design, procure and construct	10 months



Table 4 – PSCo Network Upgrades for Delivery

Element	Description	Cost Est. (Millions)
	Not Applicable	
	Total Cost Estimate for PSCo Network Upgrades for Delivery	\$0
	Total Project Estimate	\$3.97

Cost Estimate Assumptions

- Appropriation level cost estimates for Interconnection Facilities and Network/Infrastructure Upgrades for Delivery (+/- 20% accuracy) were developed by Xcel Energy/PSCo Engineering staff.
- Estimates are based on 2011 dollars (appropriate contingency and escalation applied).
- AFUDC has been excluded.
- Engineering will be performed in house.
- Lead times for materials were considered for the schedule.
- The Wind Generation Facility is not in PSCo’s retail service territory.
- PSCo (or it’s Contractor) crews will perform all construction, wiring, testing and commissioning for PSCo owned and maintained facilities.
- Construction labor is estimated for straight time only – no overtime included.
- The estimated time to design, procure and construct the interconnection facilities is approximately 10 months after authorization to proceed has been obtained.
- Authorization to proceed is considered to be the Engineering & Procurement (E&P) Agreement between PSCo and the Customer, based on the assumption that the E&P Agreement will be approved by FERC by late-October 2011.
- This project is completely independent of other queued projects and their respective ISD’s.
- A CPCN is not required for the interconnection facilities construction.
- Line and substation bus outages will be authorized during the construction period to meet requested backfeed dates.



Appendix

GI-2011-02 Missile Site 345 kV – 200 MW

A. Load Flow Thermal Results

Table 5 – Summary Listing of Overloaded Facilities (Category C Contingencies)

				Branch Contingency Loading Without GI-2011-02		Branch Contingency Loading With GI-2011-02			
Monitored Facility (Line or Transformer)	Type	Line Owner	Branch Rating MVA	N-1 Flow in MVA	N-1 Flow in % of Rating	N-1 Flow in MVA	N-1 Flow in % of Rating	% Change	NERC Category C Contingency Outage
Coors Recycling – Ft Lupton 115 kV	LN	PSCo	120	118.8	99.0	122.3	101.9	2.9	Isabelle – Ft St Vrain 230 kV Valmont – Spindle 230 kV



B. Generation Dispatch

Case: 2013 HS, Missile Site 230 kV Wind at 77% of rated, Peetz Logan Wind at 21% of rated, based on WECC 12hs3sap.sav including updates from CCPG companies.

Benchmark Case

Arapahoe Unit 3	48 MW
Arapahoe Unit 4	118 MW
Cabin Creek Units	210 MW
Cherokee Units 1 & 2	0 MW
Cherokee Unit 3	165 MW
Cherokee Unit 4	383 MW
Comanche Unit 1	360 MW
Comanche Unit 2	365 MW
Ft Lupton Units 1 & 2	0 MW
Pawnee Unit 1	536 MW
Manchief Units 1 & 2	0 MW
FSV Units 1-4	700 MW
Valmont Unit 5	196 MW
Valmont Unit 6	0 MW
QF Thermo	129 MW
Brush Units 1, 3, & 4	0 MW
Brush Unit 2	70 MW
QF UNC	65 MW
Arapahoe Units 5-7	0 MW
Valmont Units 7 & 8	0 MW
Lamar DC Tie	210 MW Export to SPS
Spruce Units 1 & 2	282 MW
Brighton Units 1 & 2	95 MW
Fountain Valley Units	0 MW
Plains End Units	227.6 MW
RMEC Units 1-3	615 MW
Spindle Units 1 & 2	278 MW
Missile Site 230 kV	192.7 MW (77%)
Peetz Logan 230 kV	120.9 MW (21%)
Comanche Unit 3	804 MW
Cedar Creek Wind	115.5 MW (21%)
Ft St Vrain Unit 5 & 6	295 MW
Rawhide Plant	483 MW (PRPA)
Baculite Mesa Plant	413.3 MW (BHE)
Lincoln Plant	65 MW (TSGT)



GI-2011-02 Case Adjustments

GI-2011-02	200 MW
Brighton Units 1 & 2	0 MW
Plains End Units	130.5 MW



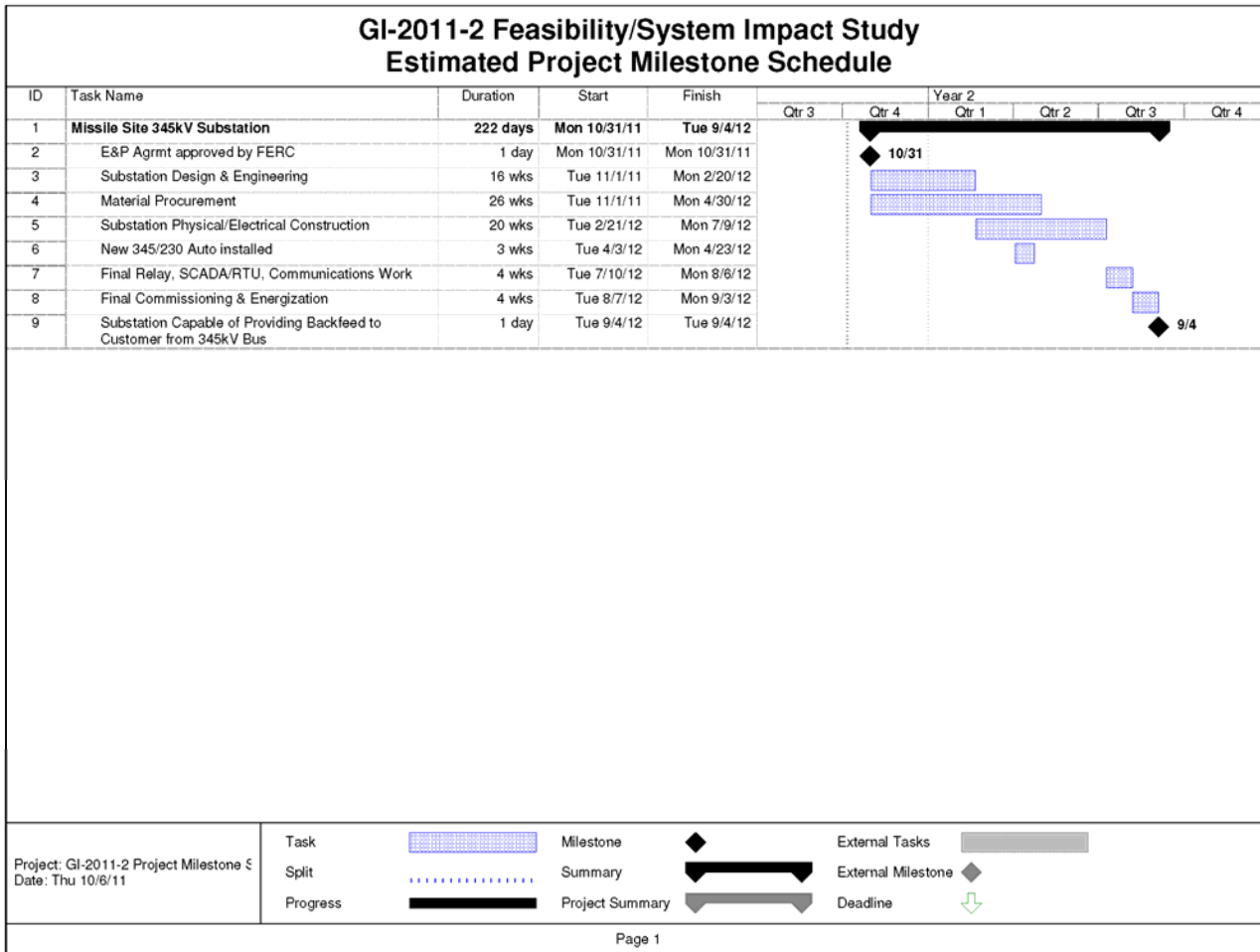
C. Transient Stability Studies

Table 6. Results of Transient Stability Analysis

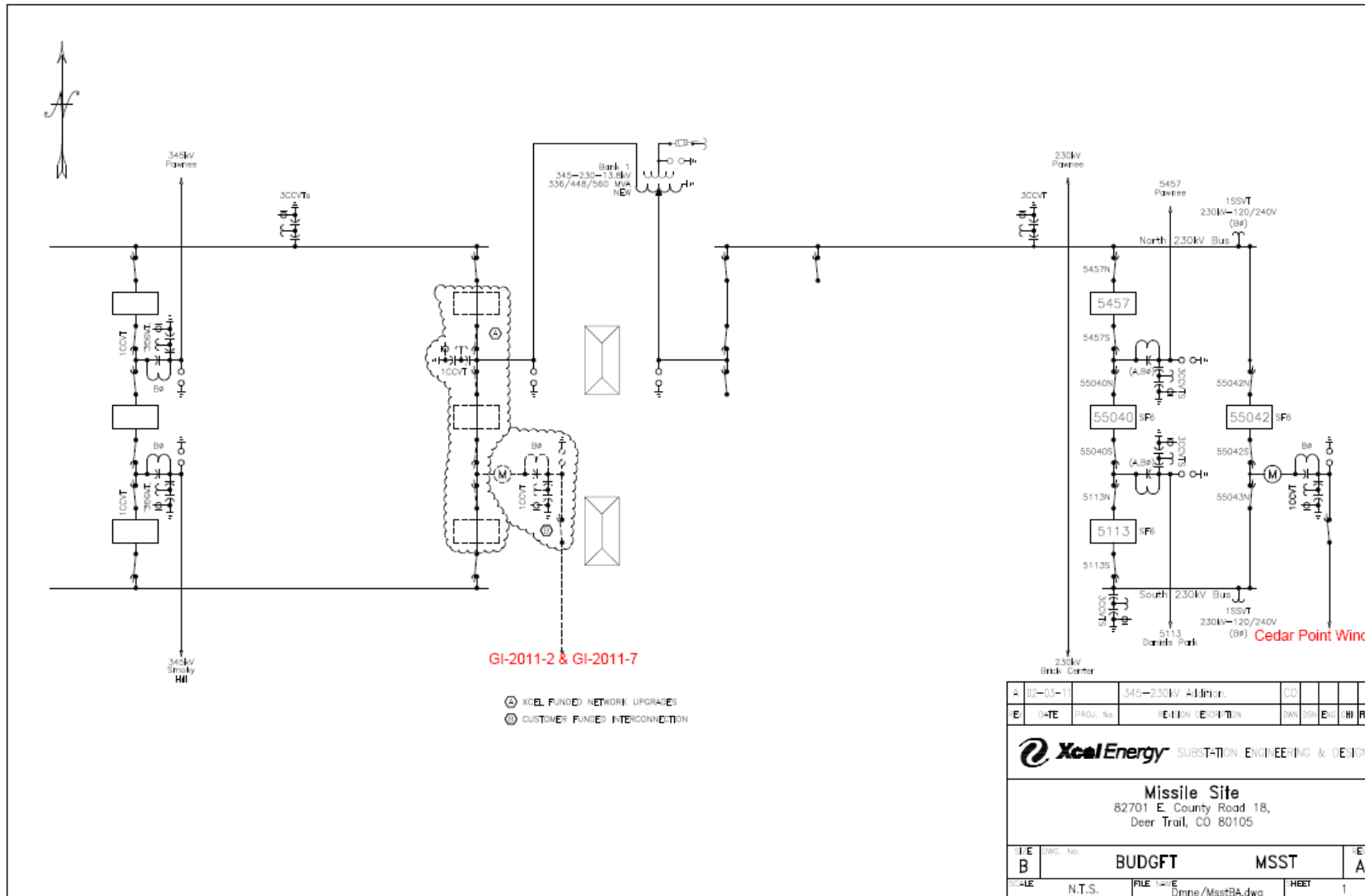
Disturbance Scenario #	Fault Type	Total Clearing Time	Fault Location	Tripped Facilities	Benchmark Case 2013	With generation at the GI-2011-2 site 2013 Case
100	3ph	5 cycles	Missile Site 345 kV	Missile Site - Pawnee 345 kV	Stable, no violation	Stable, no violation
101				Missile Site - Smoky Hill 345 kV	Stable, no violation	Stable, no violation
102				Missile Site 345/230 kV Trf #1	Stable, no violation	Stable, no violation
110	3ph	6 cycles	Pawnee 230 kV	Pawnee - Story 230 kV	Stable, no violation	Stable, no violation
111				Pawnee - Ft Lupton 230 kV	Stable, no violation	Stable, no violation
112				Pawnee - Brick Center 230 kV	Stable, no violation	Stable, no violation
200	slg with Breaker Failure	20 cycles	Pawnee 230 kV	Pawnee - Story 230 kV with Pawnee - Missile Site 230 kV tripping due to breaker failure	Stable, no violation	Stable, no violation
201				Pawnee - Missile Site 230 kV with Pawnee - Story 230 kV tripping due to breaker failure	Stable, no violation	Stable, no violation
300	slg with Protection System Failure	21 cycles	Pawnee 230 kV	Pawnee - Story 230 kV	Stable, no violation	Stable, no violation
301				Pawnee - Ft Lupton 230 kV	Stable, no violation	Stable, no violation
302				Pawnee - Brick Center 230 kV	Stable, no violation	Stable, no violation



D. Proposed Project Schedule



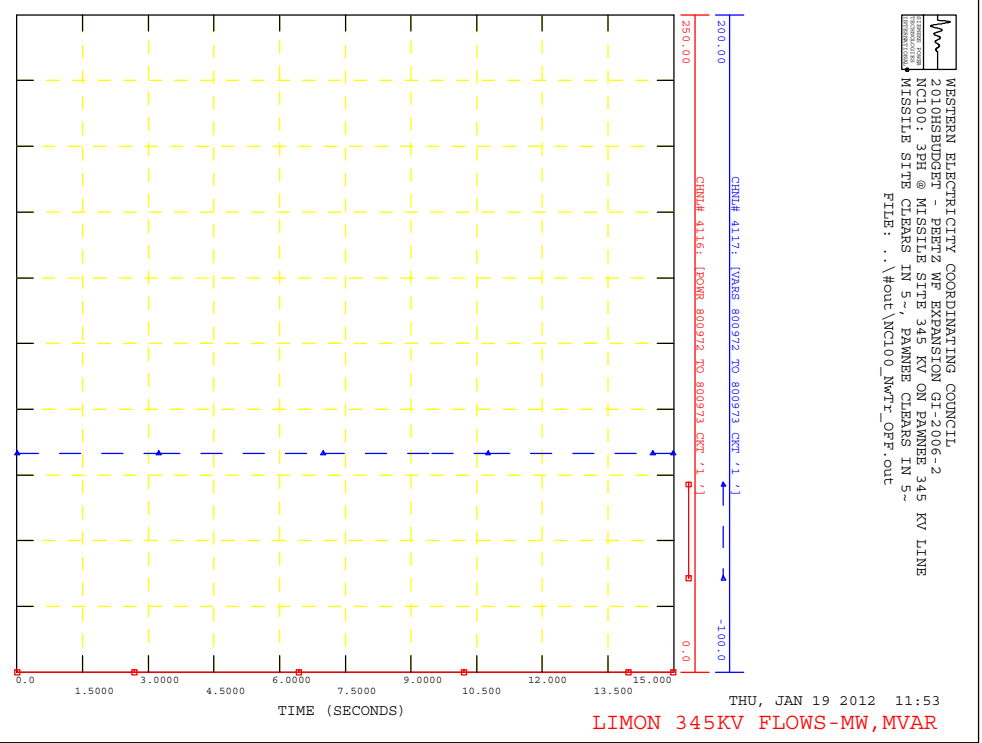
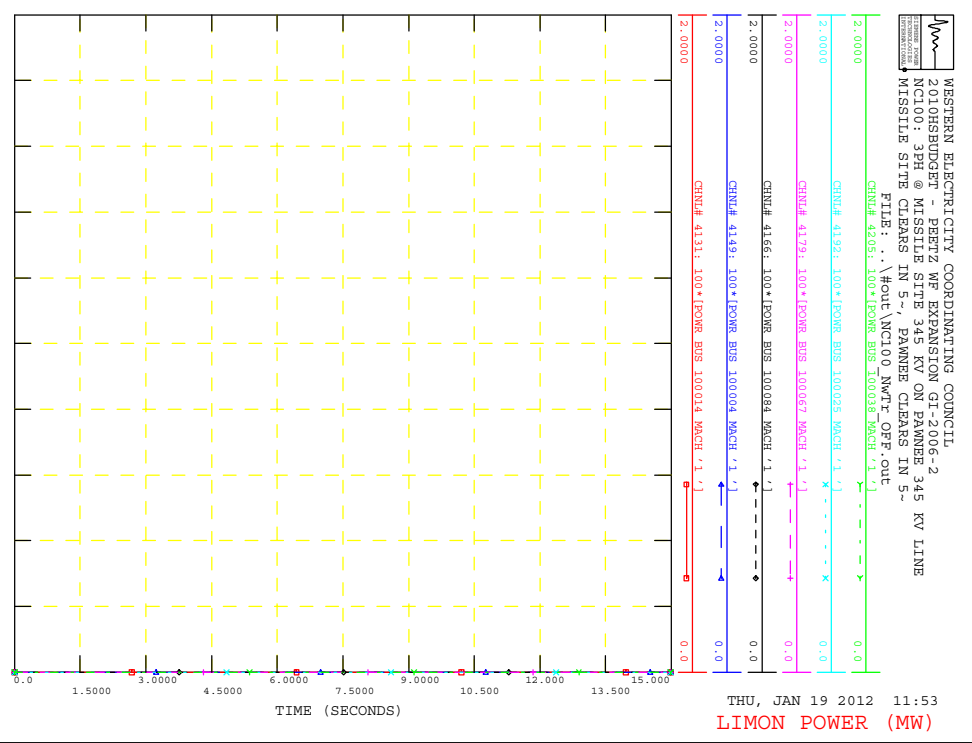
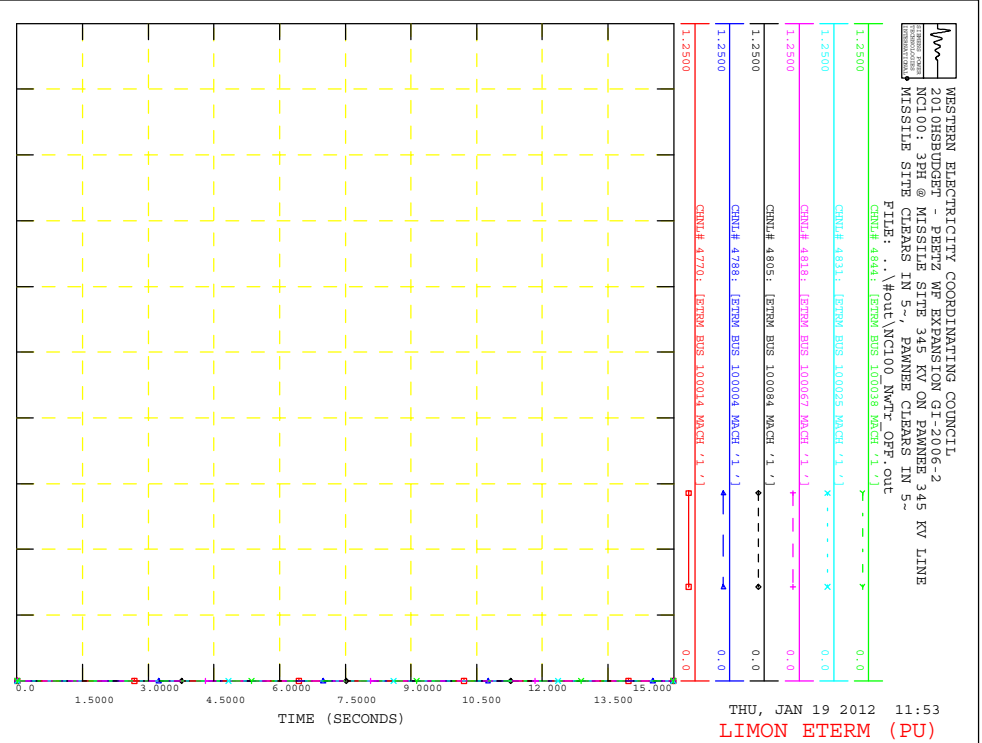
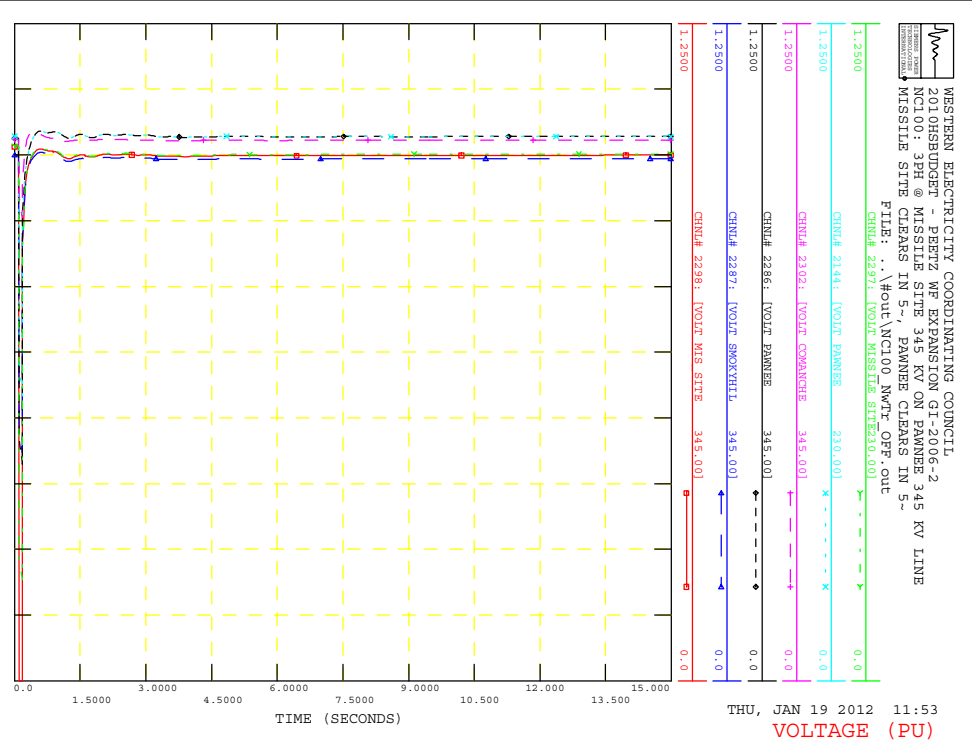
E. Proposed Missile Site Substation One-Line



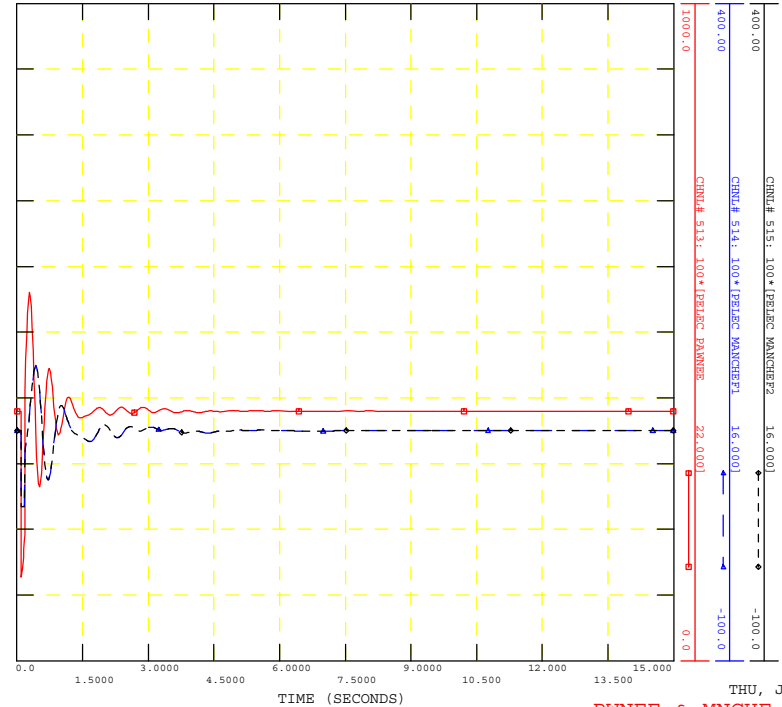


F. Transient Stability Study Plots

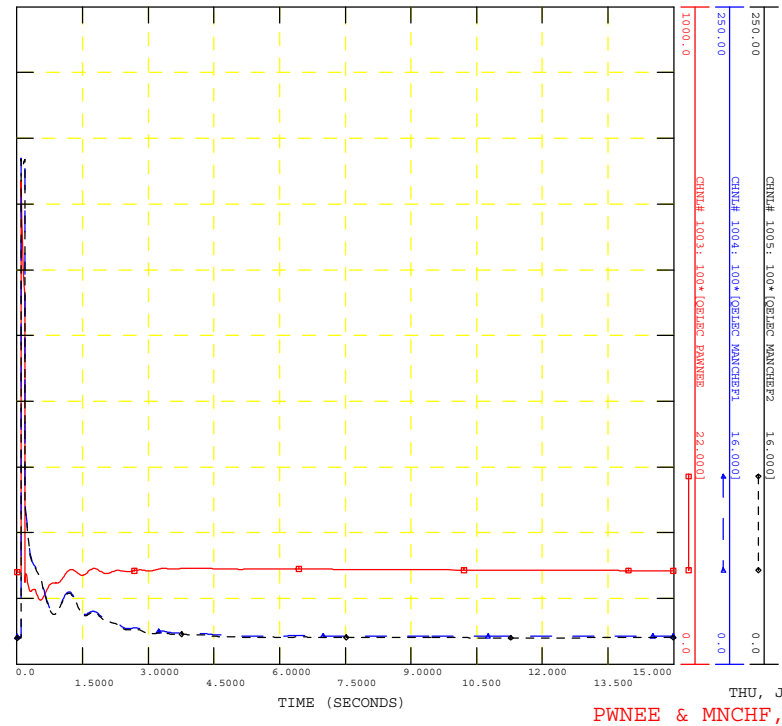
Transient Stability Study Plots on Following Pages



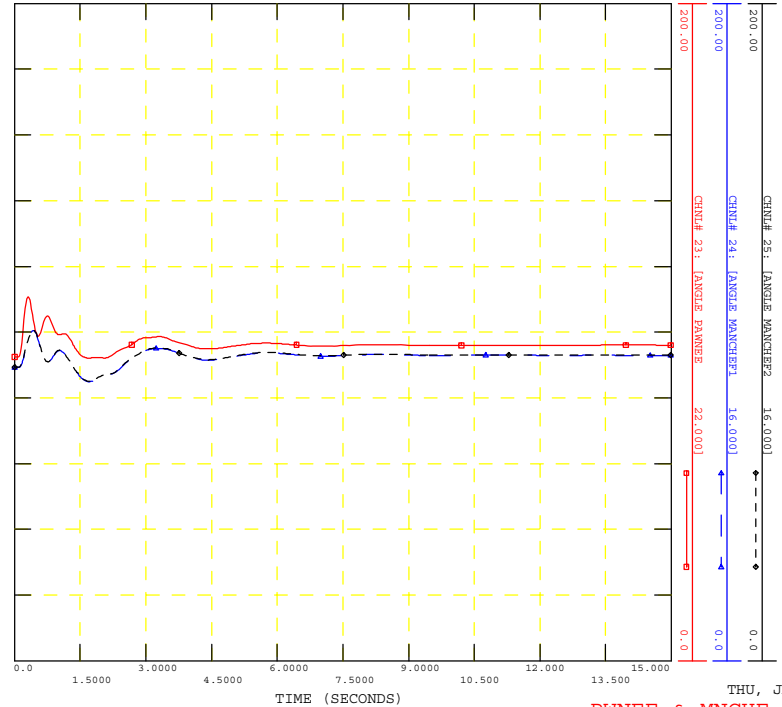
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_MWTF_OFF.out



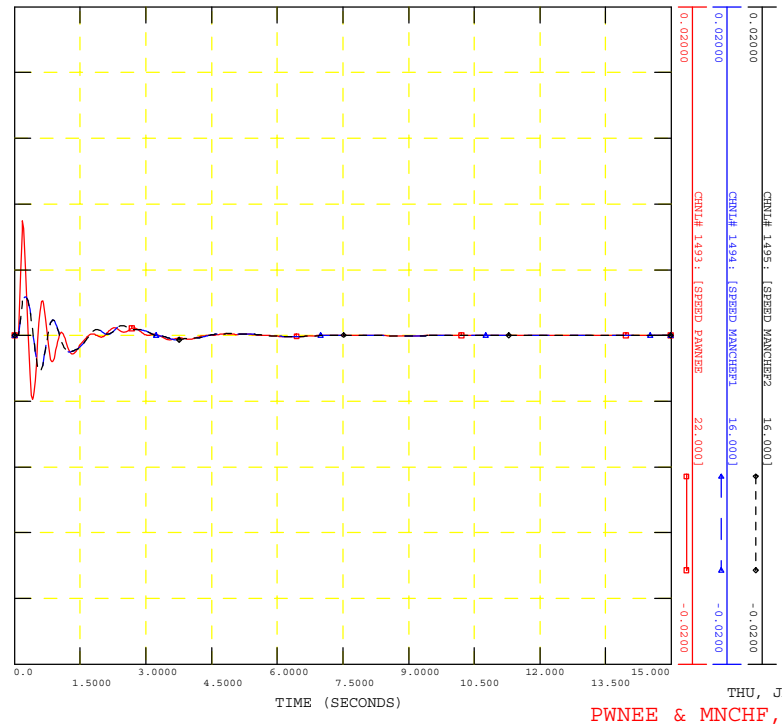
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_MWTF_OFF.out



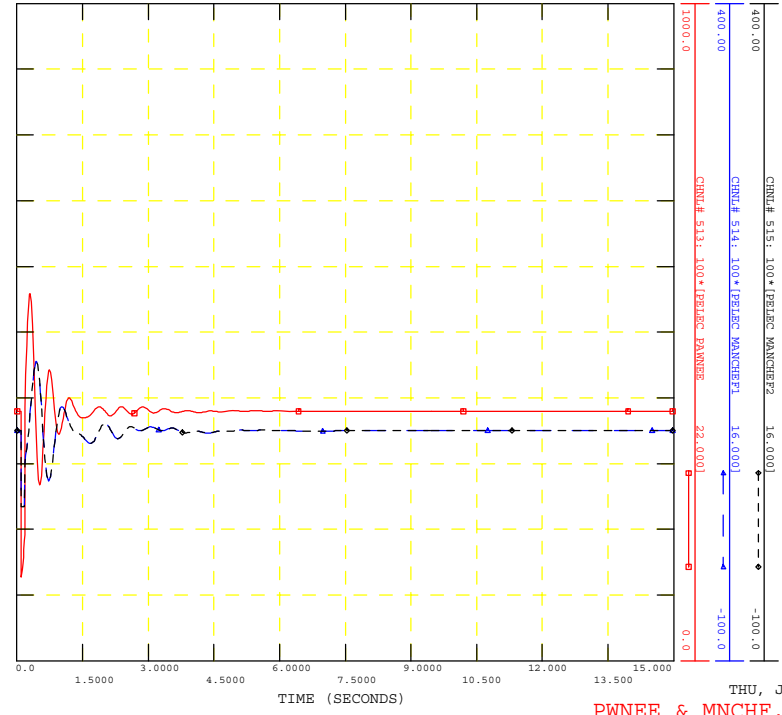
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_MWTF_OFF.out



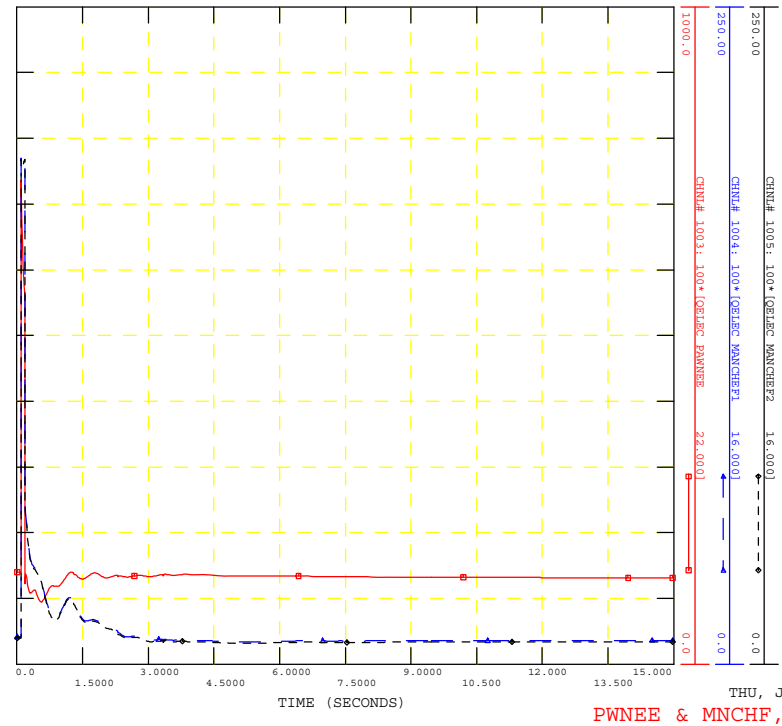
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_MWTF_OFF.out



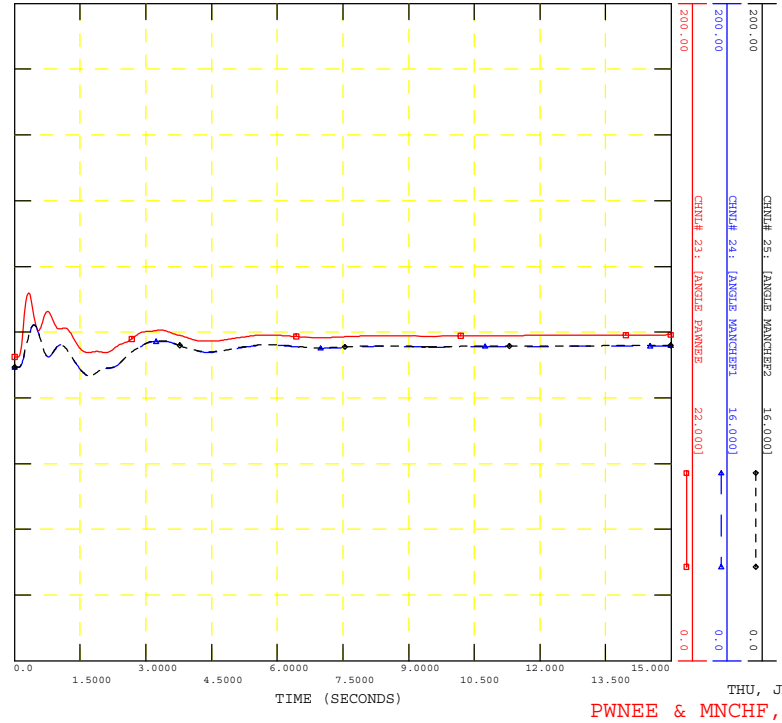
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_MWTF_Off.out



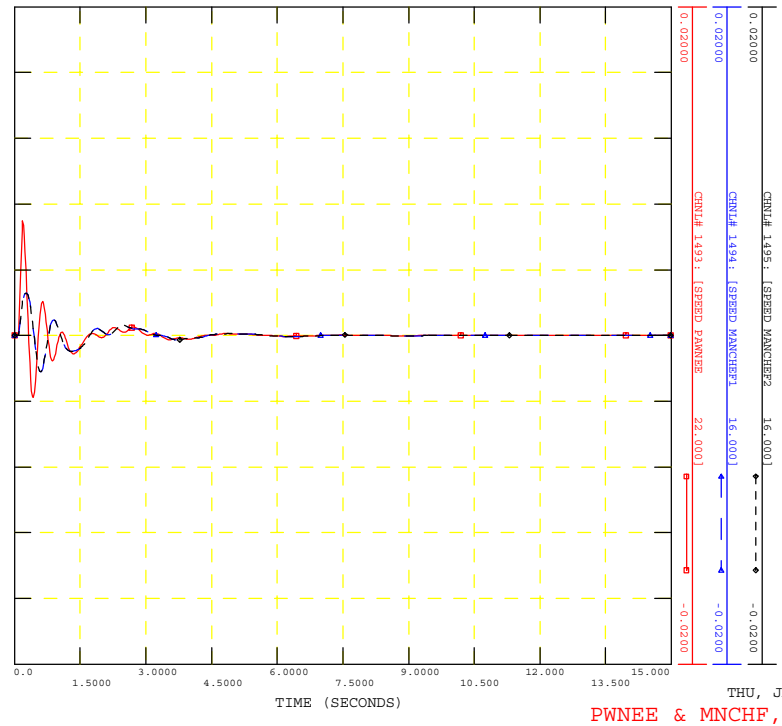
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_MWTF_Off.out

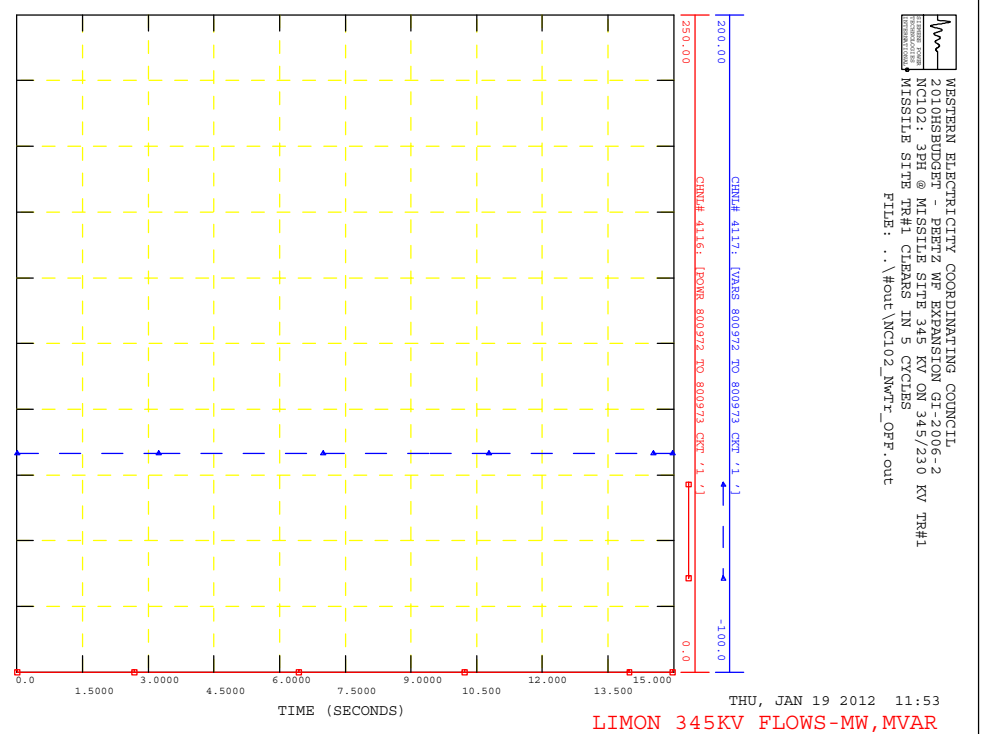
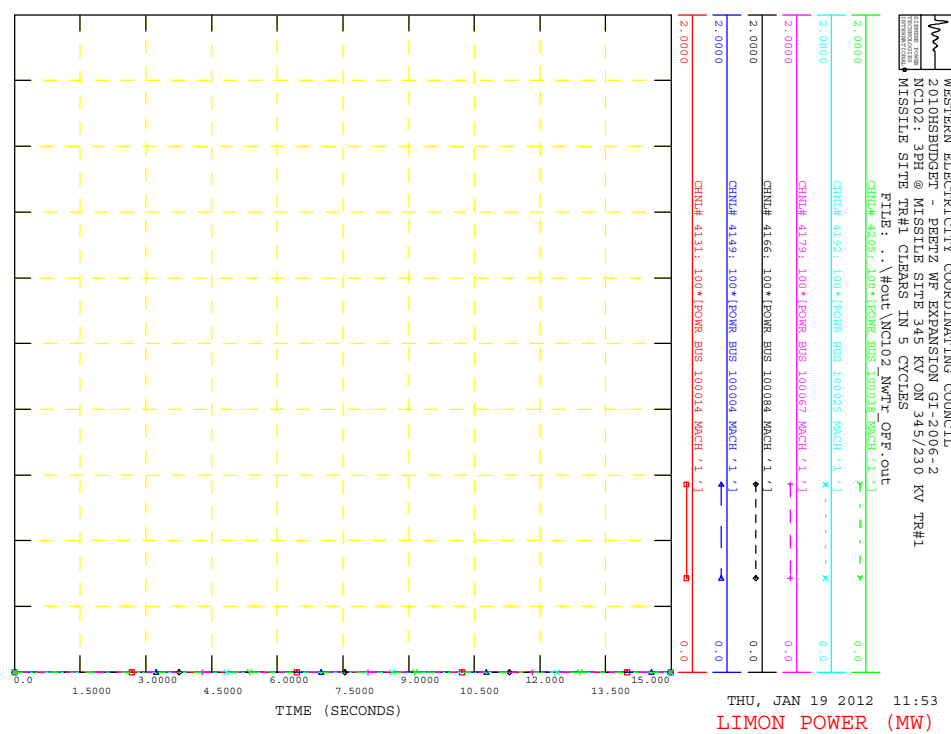
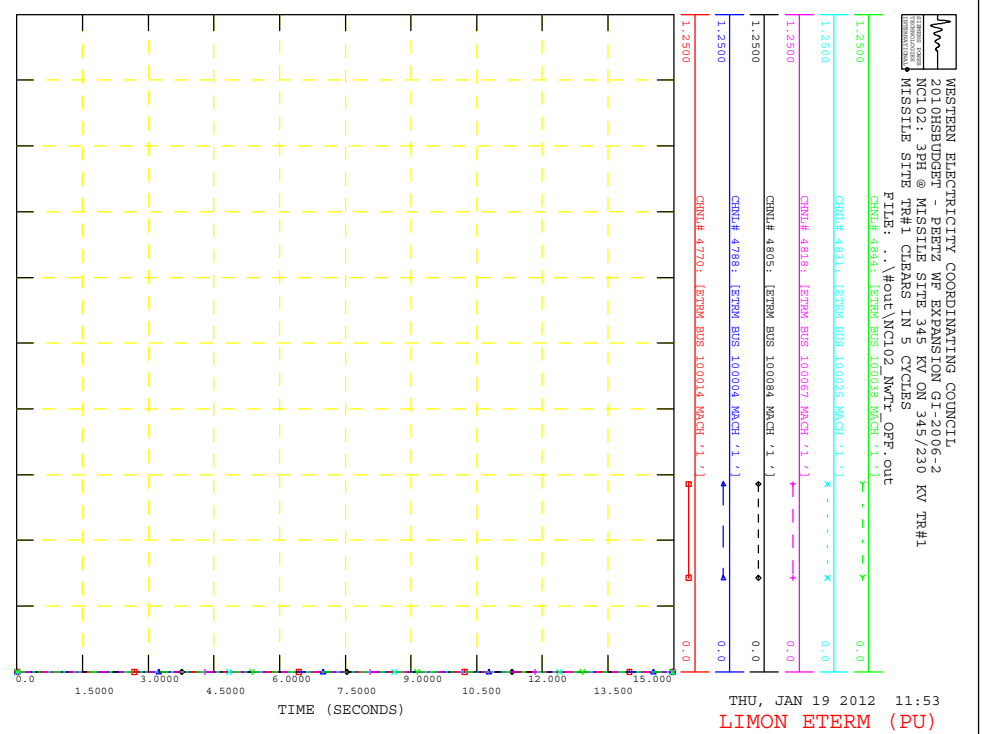
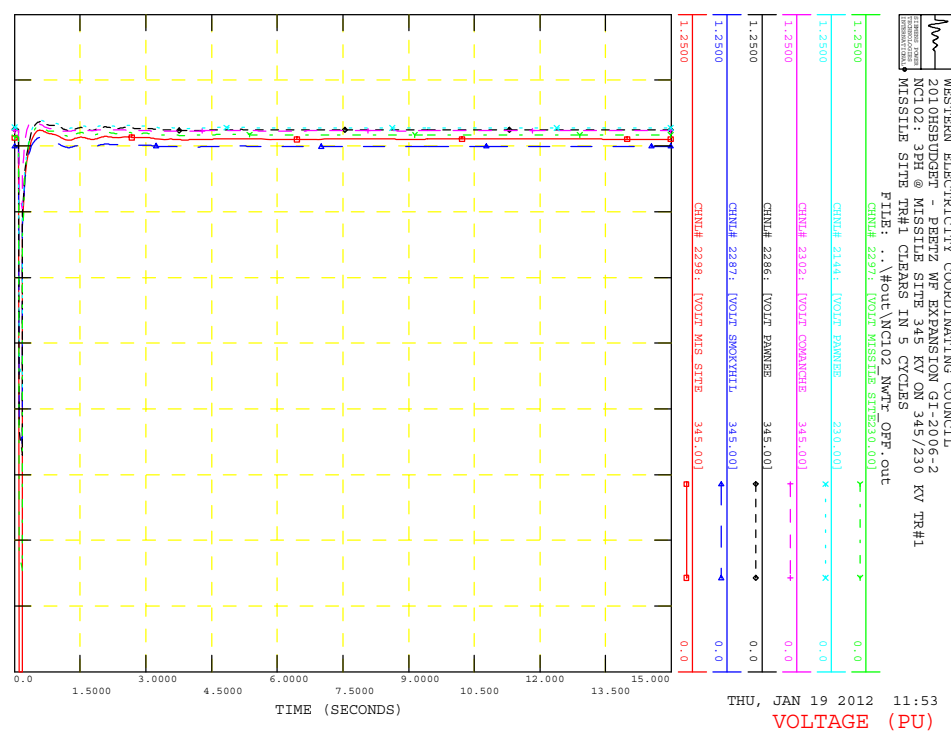


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_MWTF_Off.out

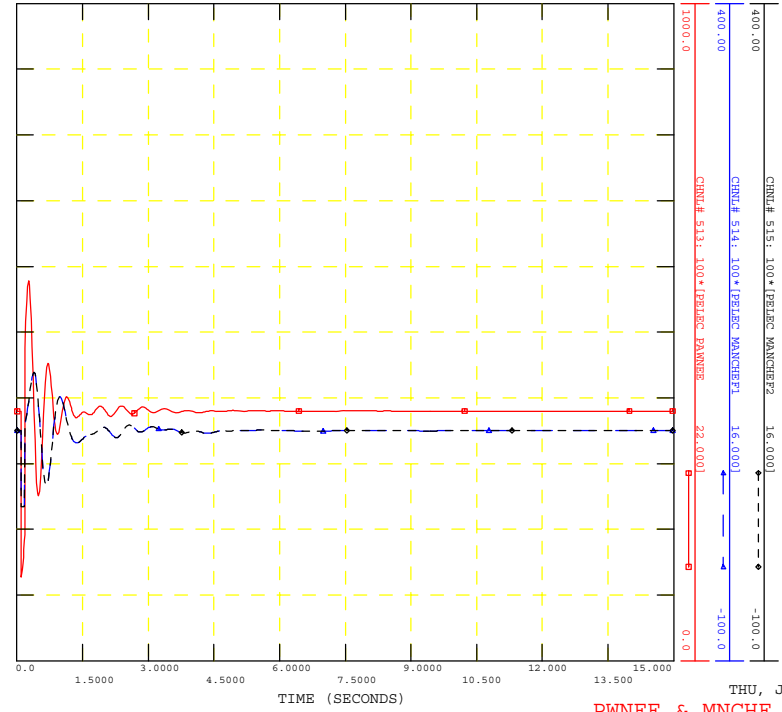


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_MWTF_Off.out

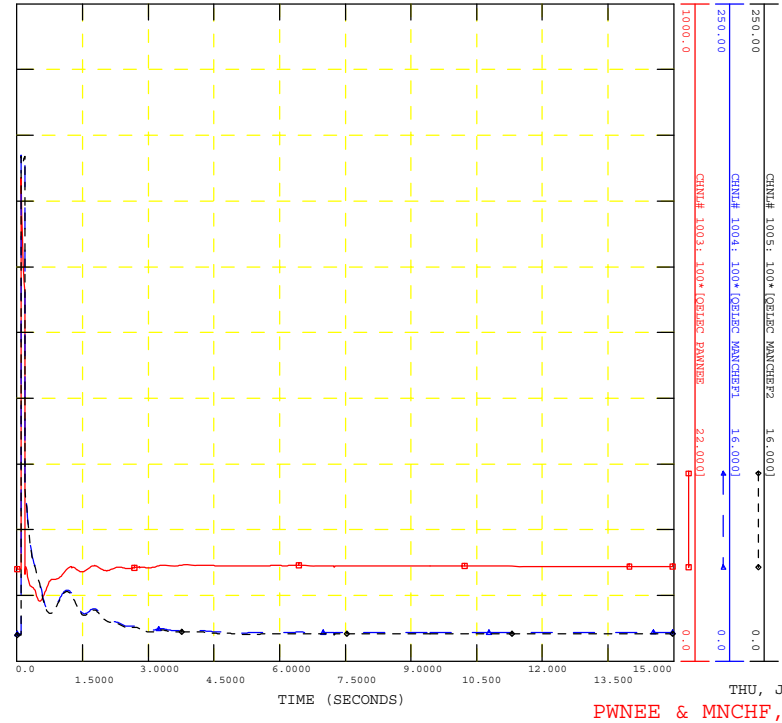




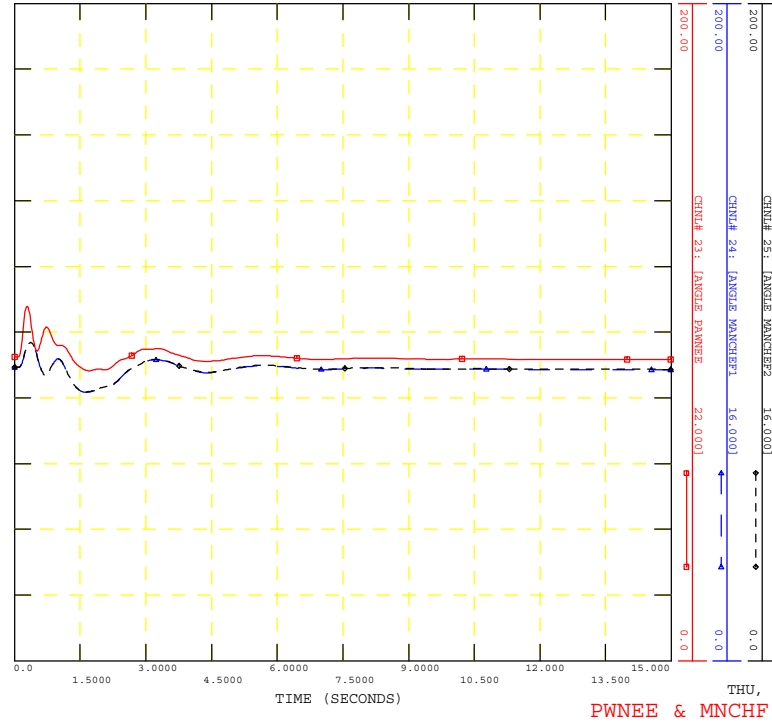
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEITZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_MWTF_OFF.out



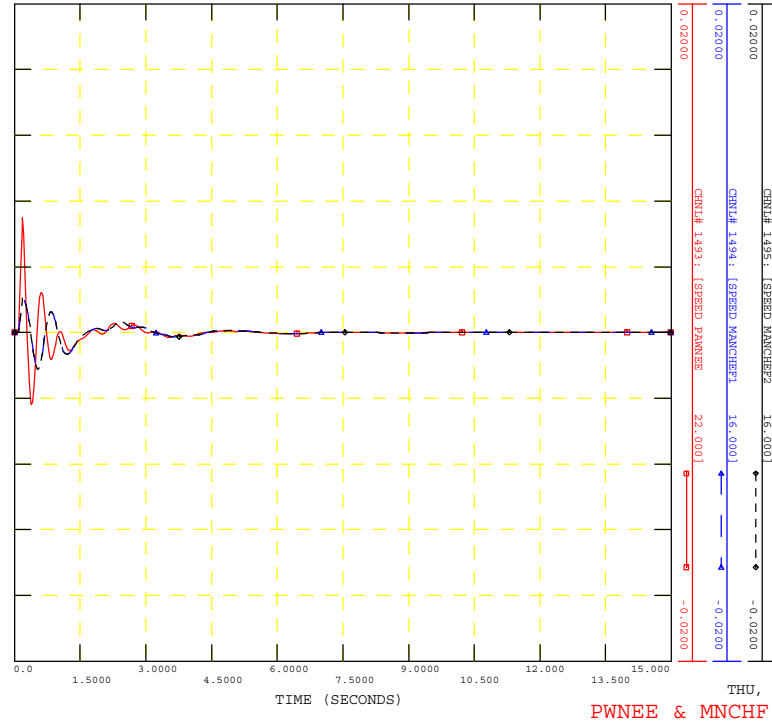
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEITZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_MWTF_OFF.out

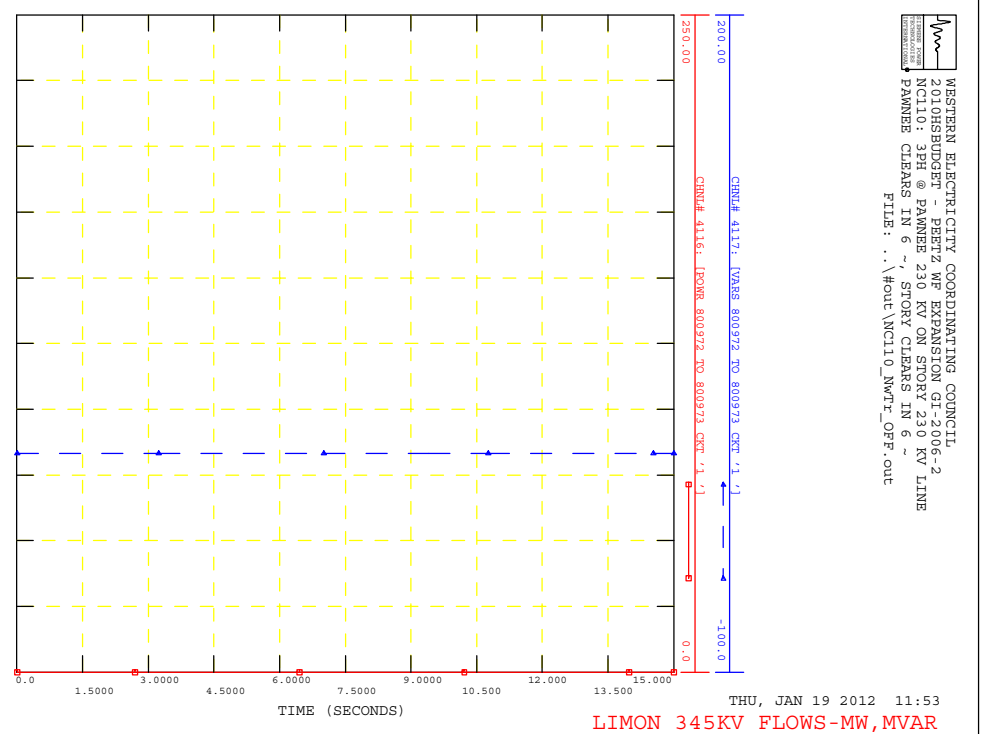
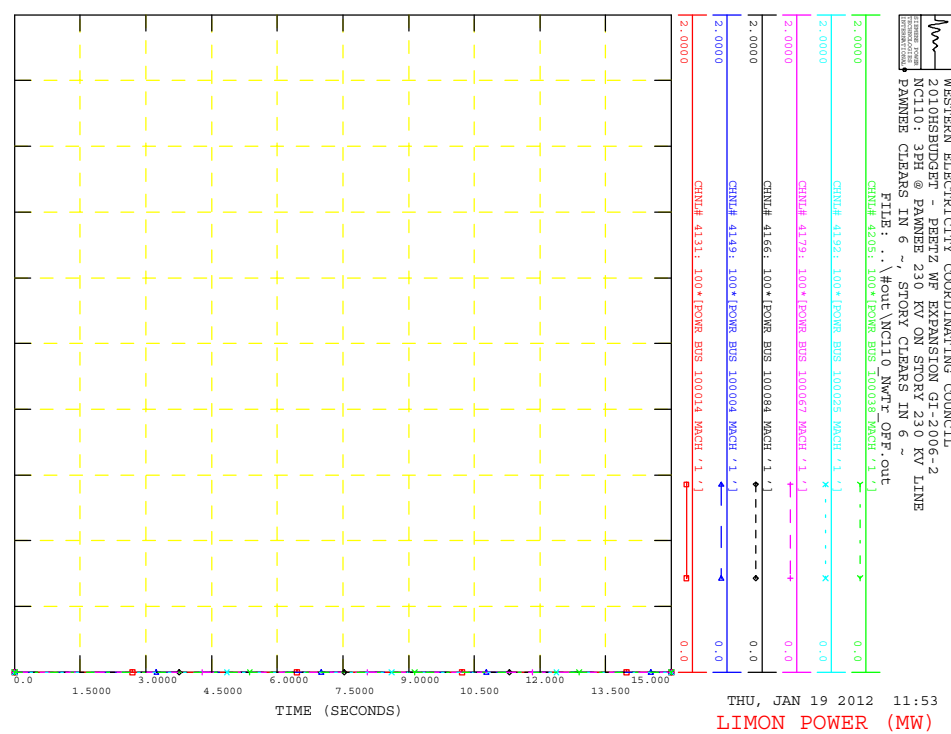
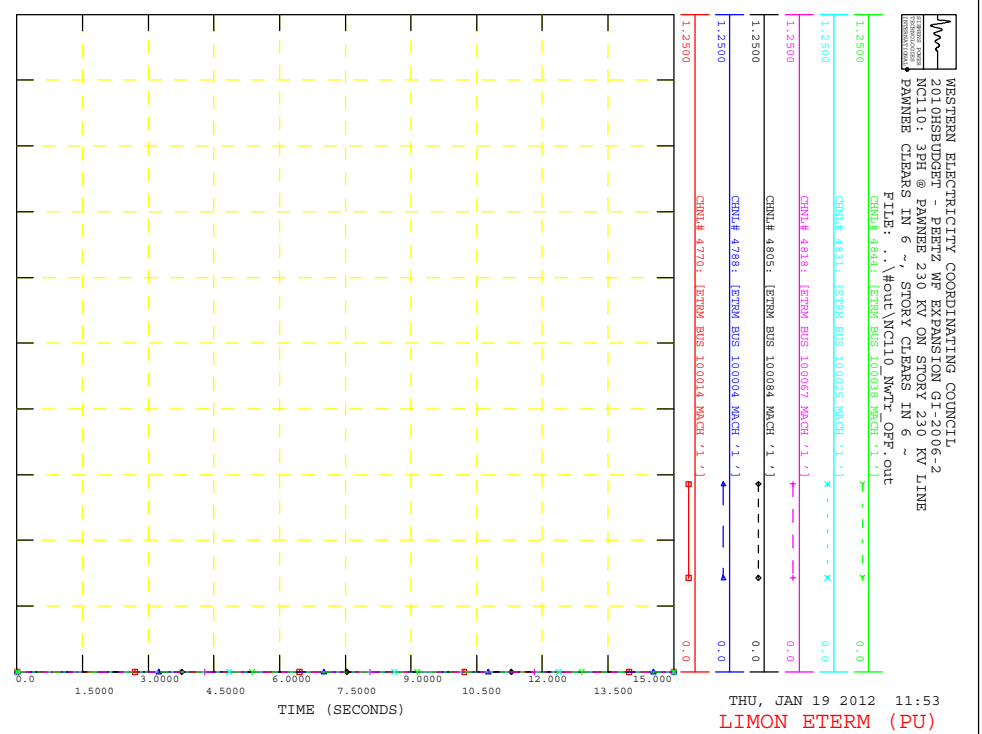
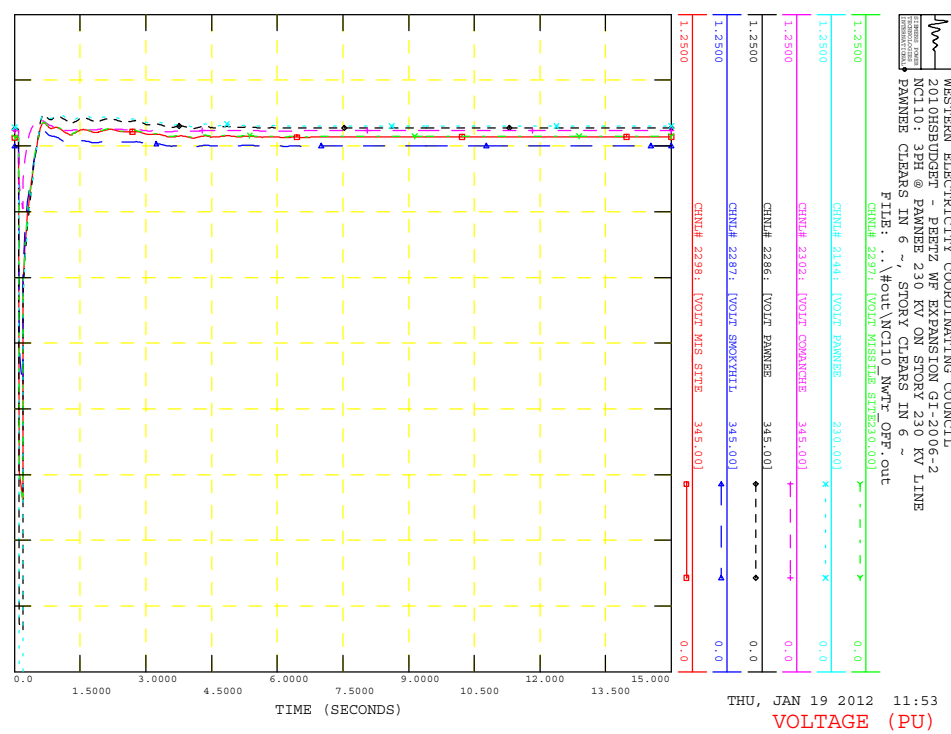


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEITZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_MWTF_OFF.out

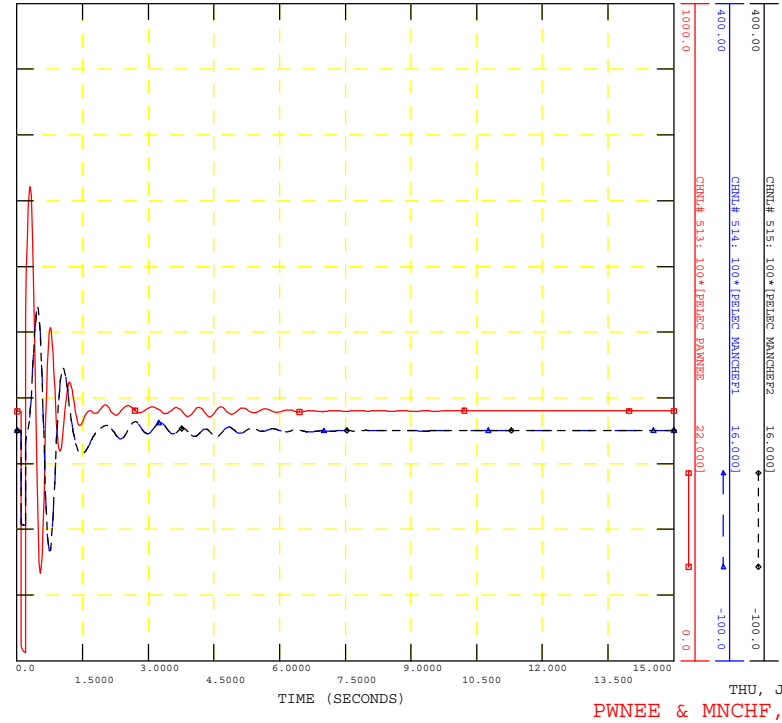


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEITZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_MWTF_OFF.out

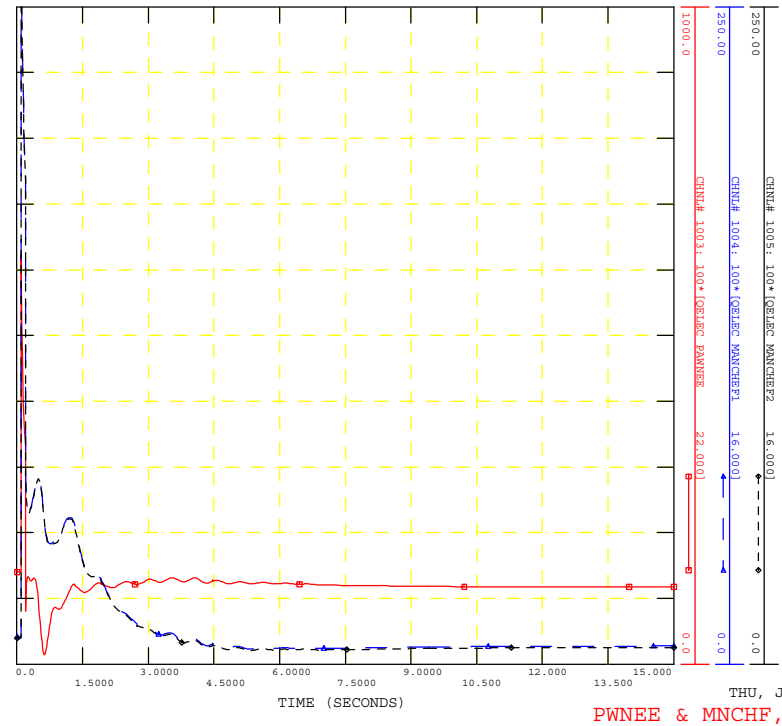




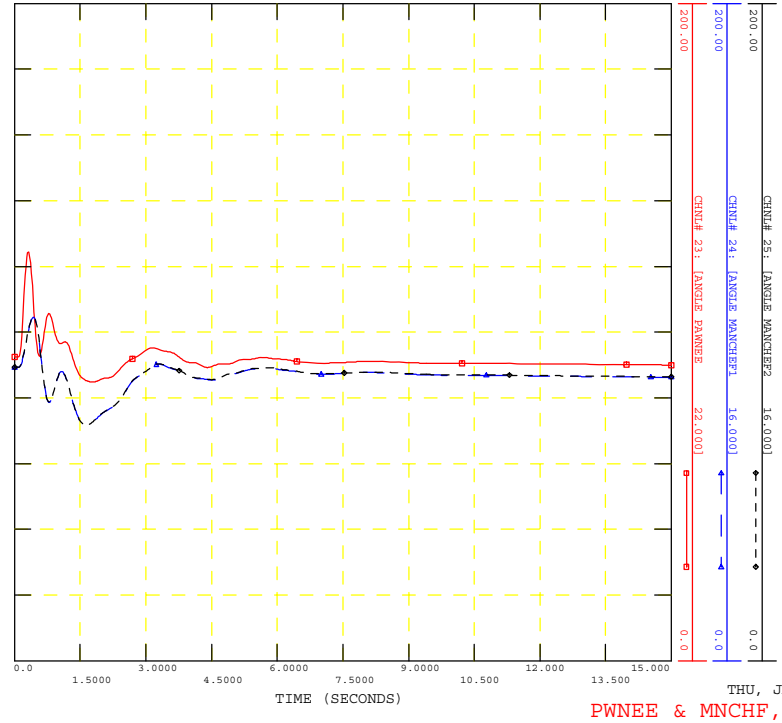
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION G1-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_MWTF_OFF.out



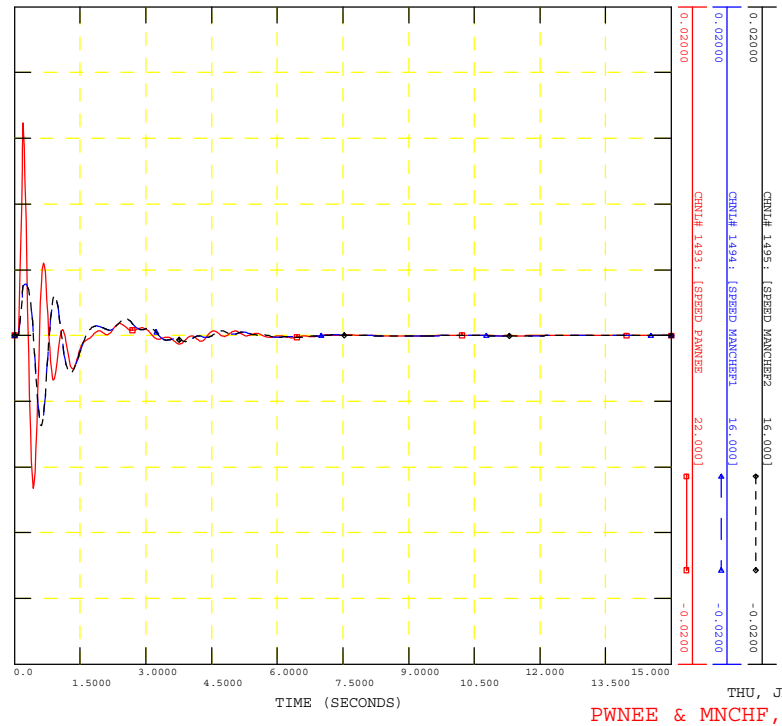
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION G1-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_MWTF_OFF.out

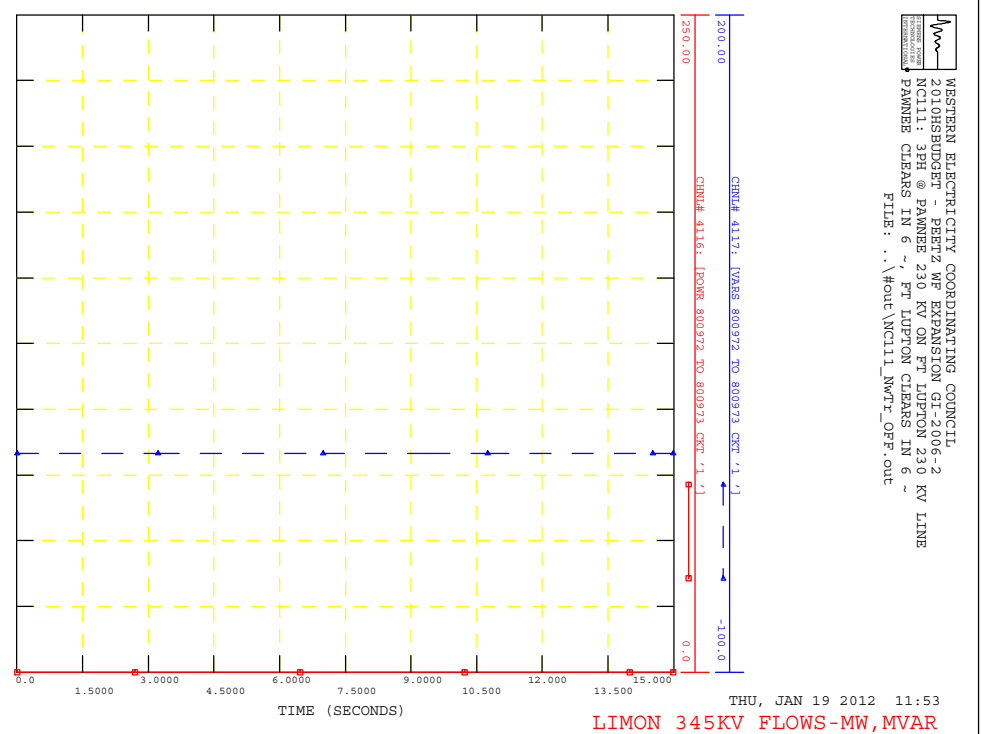
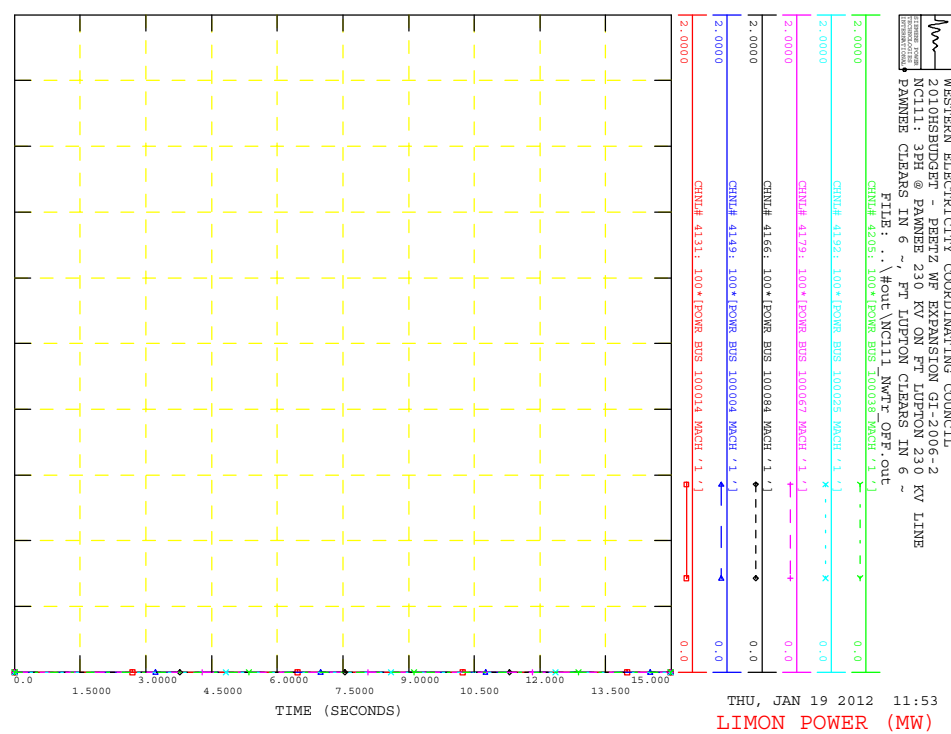
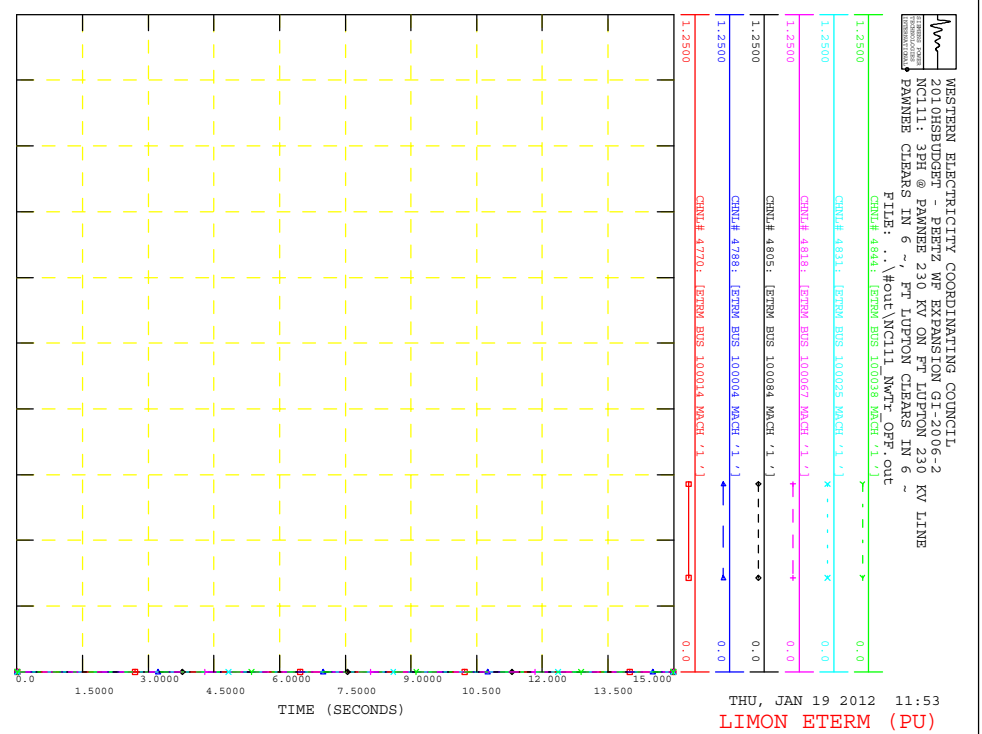
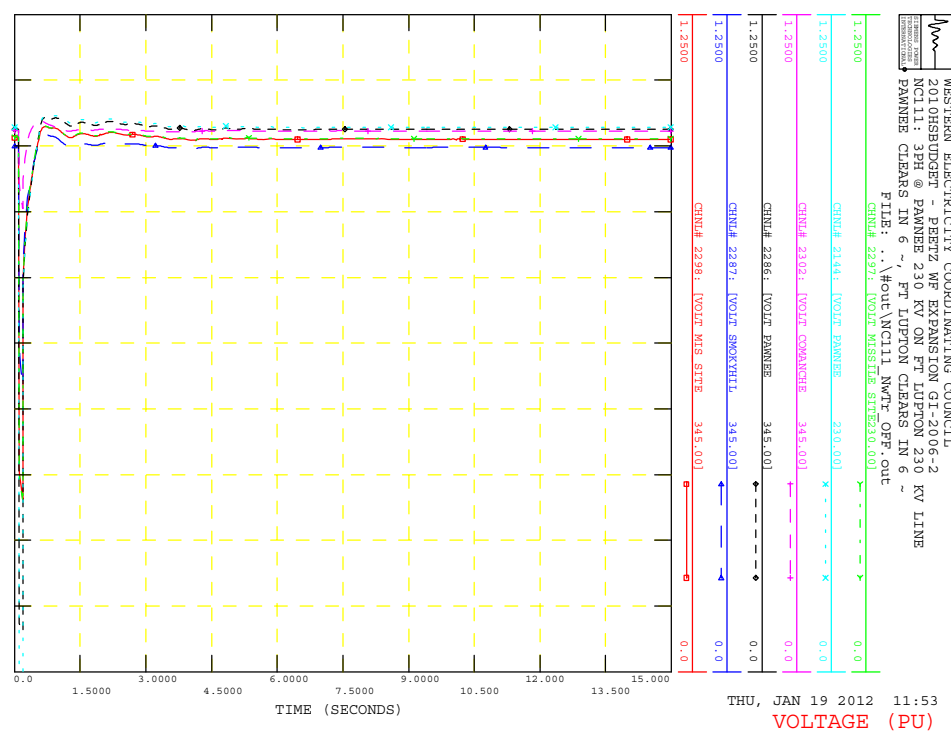


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION G1-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_MWTF_OFF.out

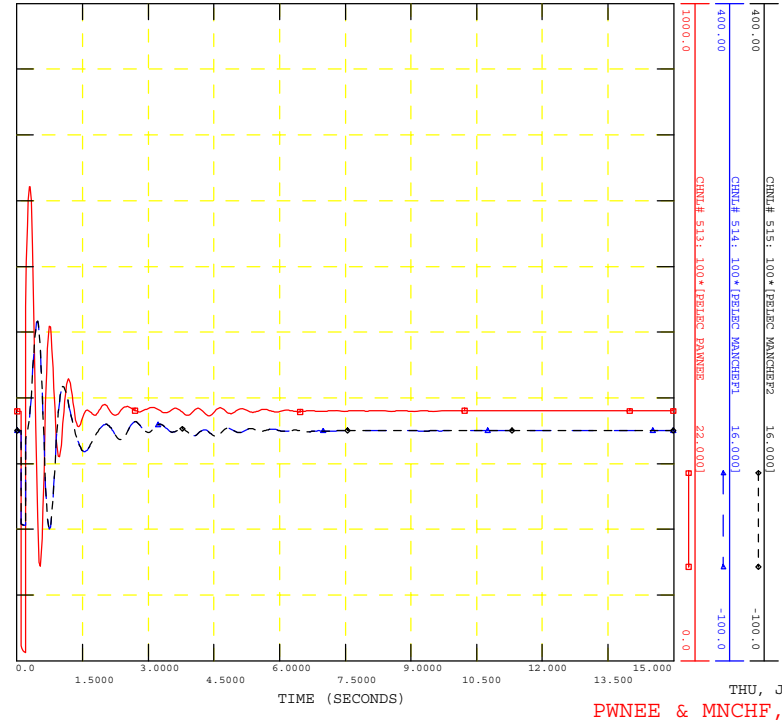


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION G1-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_MWTF_OFF.out

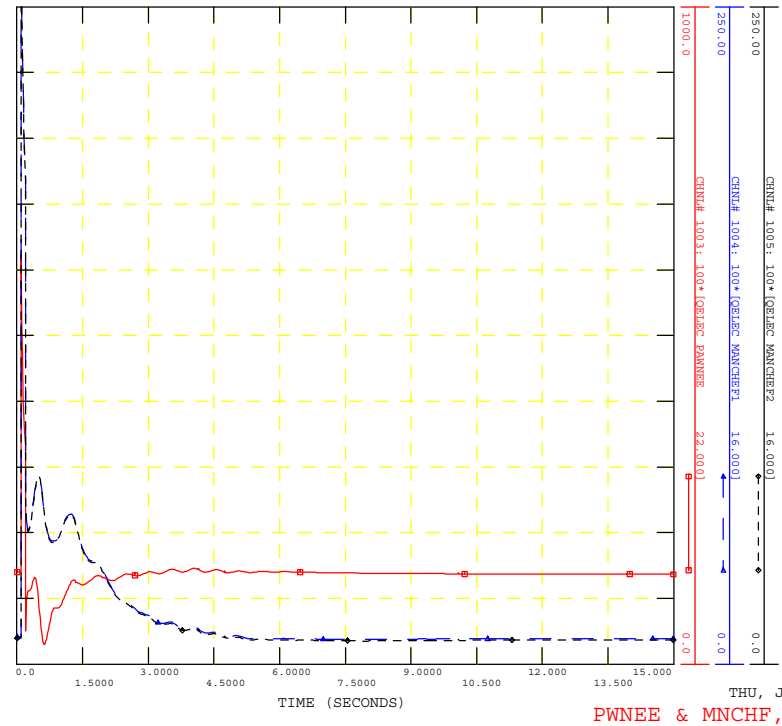




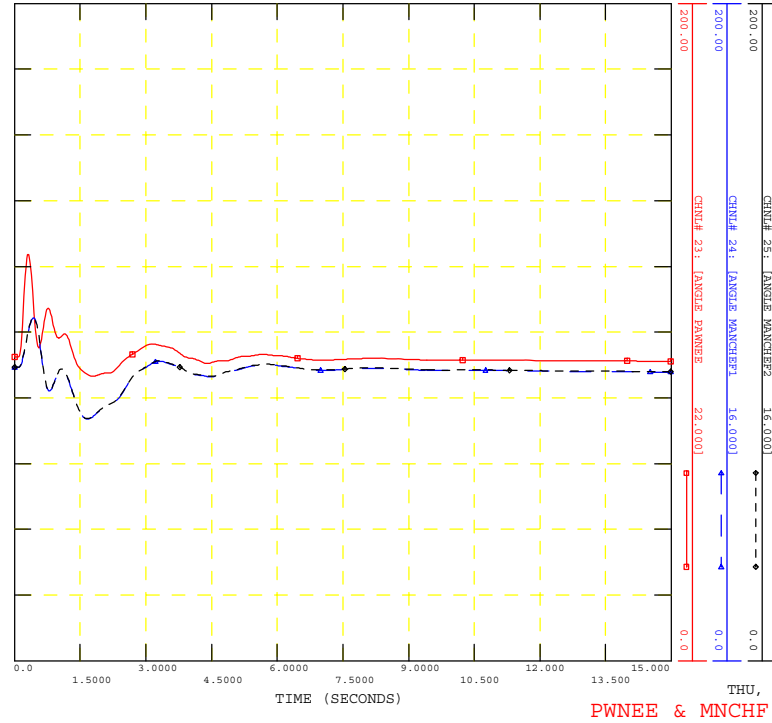
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANNEE 230 KV ON FT LUTPON 230 KV LINE
 PANNEE CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\hour\NC11_MWTE_OFF.out



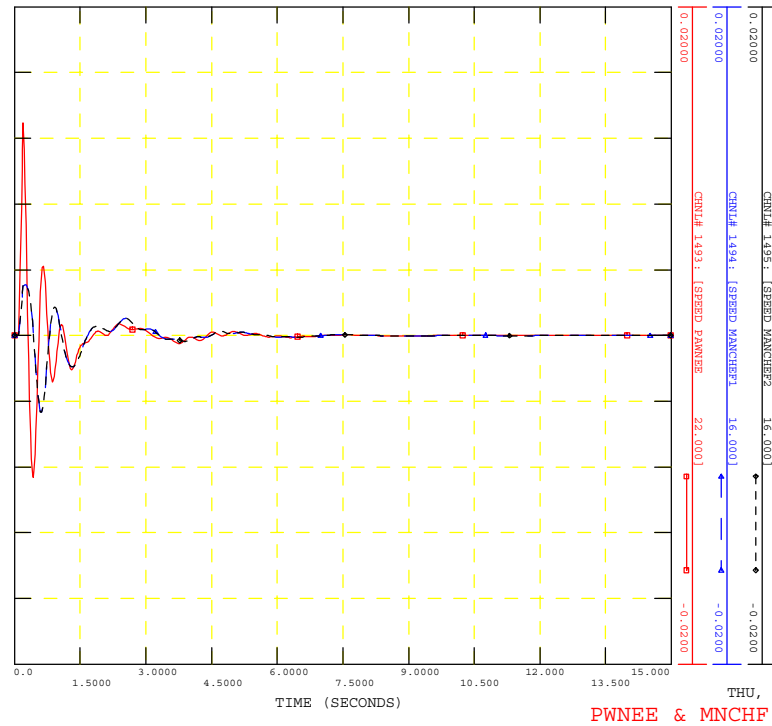
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANNEE 230 KV ON FT LUTPON 230 KV LINE
 PANNEE CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\hour\NC11_MWTE_OFF.out

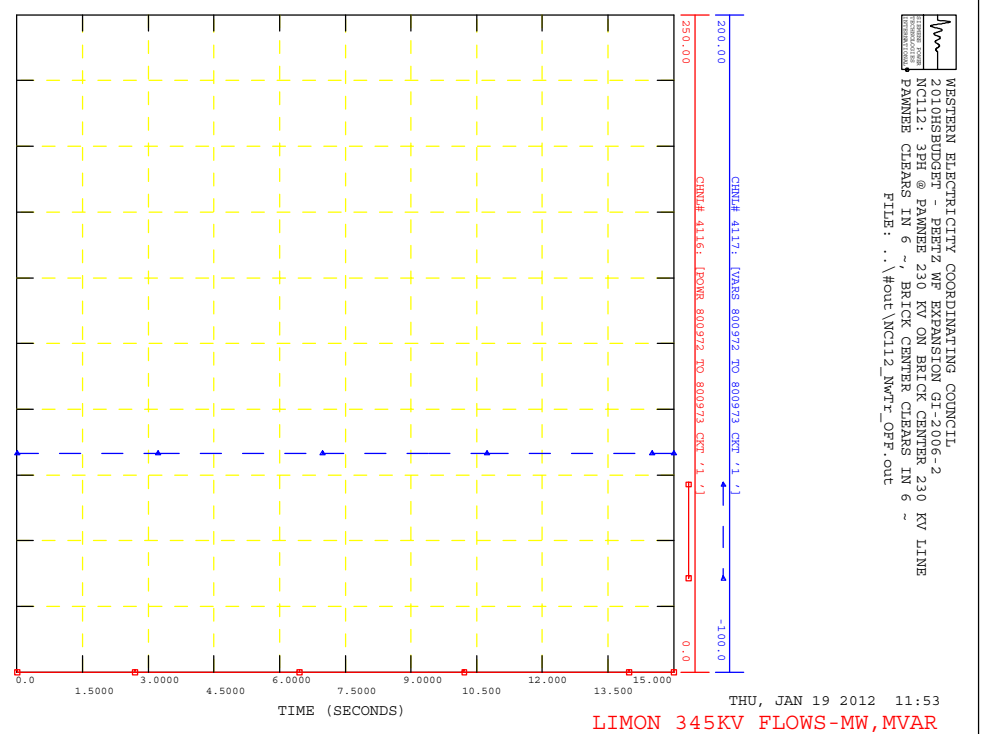
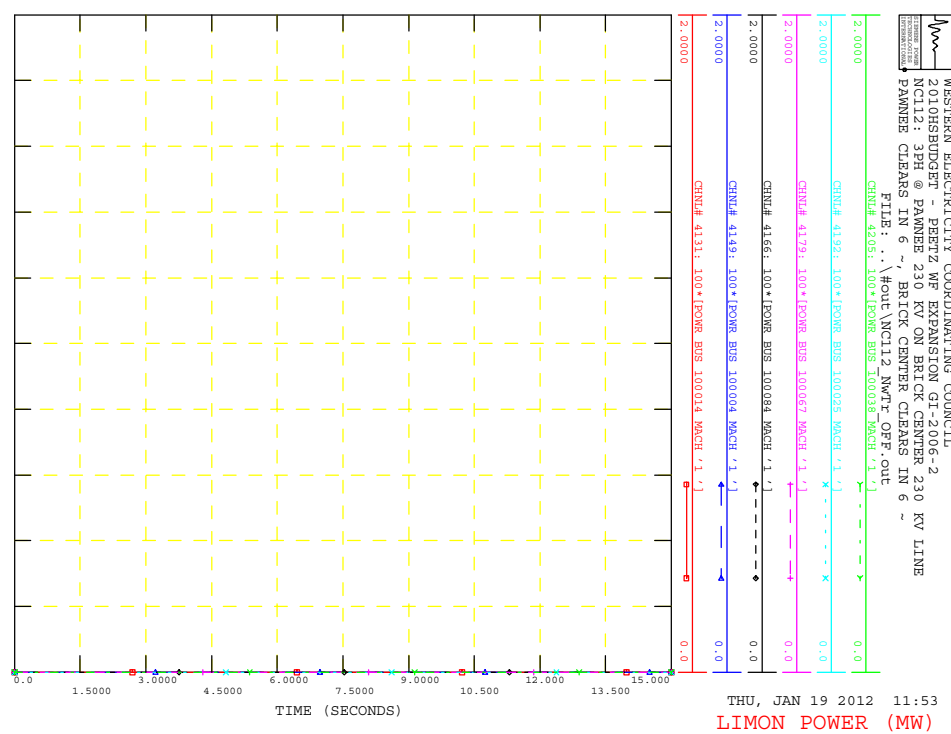
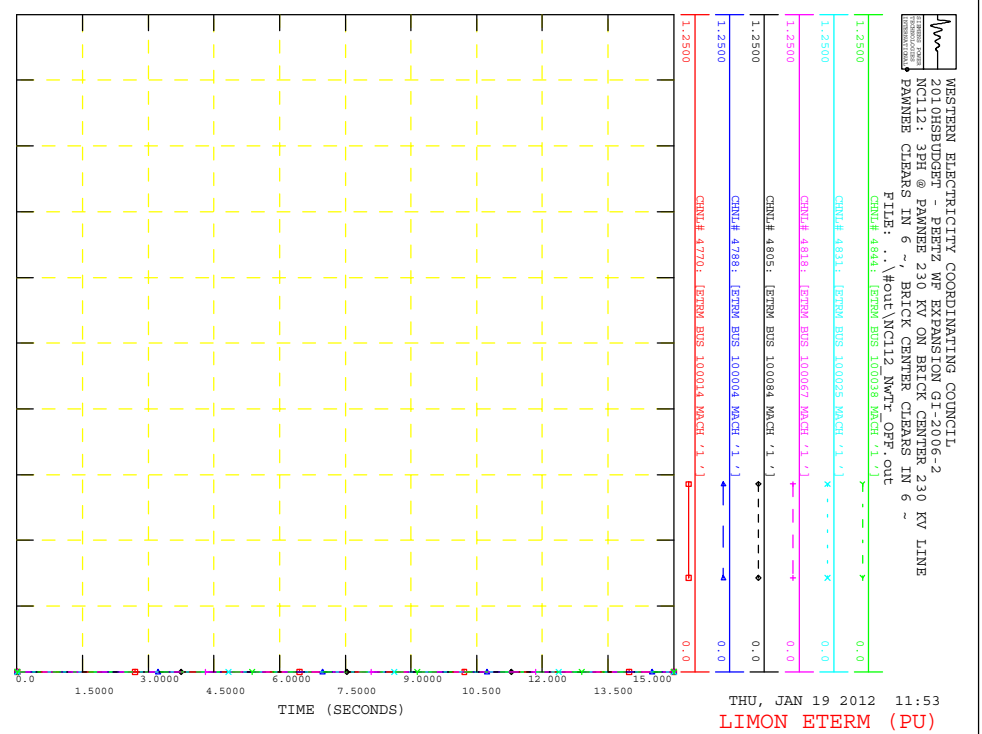
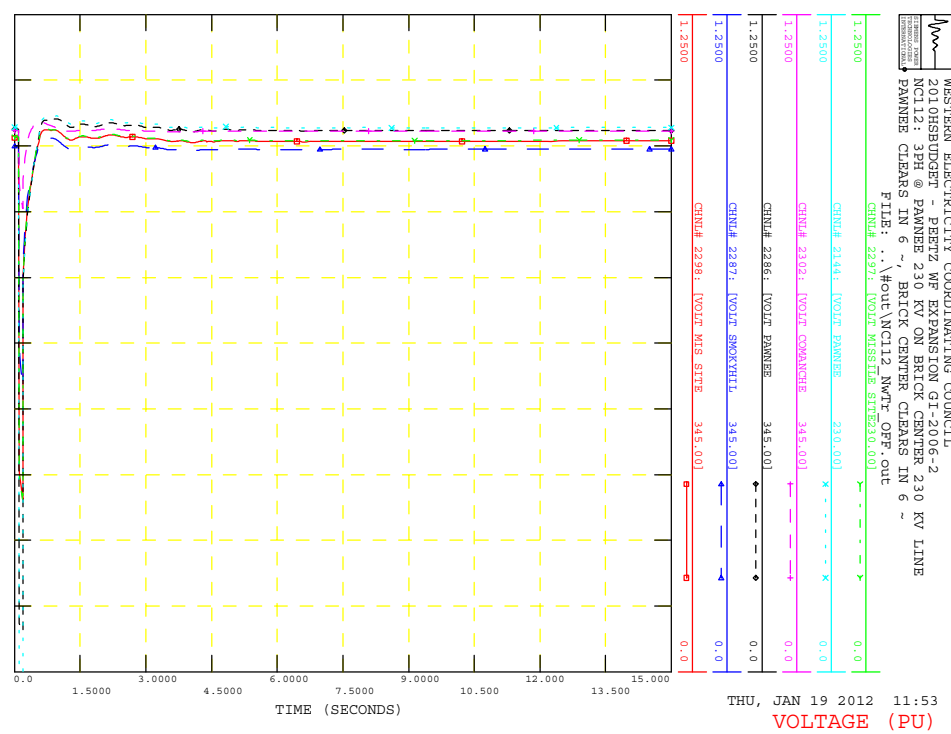


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANNEE 230 KV ON FT LUTPON 230 KV LINE
 PANNEE CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\hour\NC11_MWTE_OFF.out

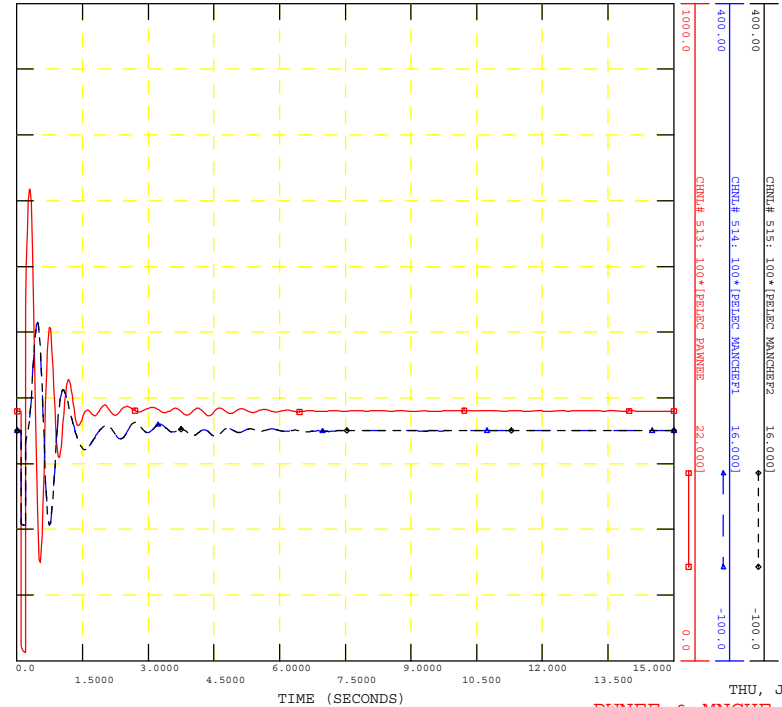


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANNEE 230 KV ON FT LUTPON 230 KV LINE
 PANNEE CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\hour\NC11_MWTE_OFF.out



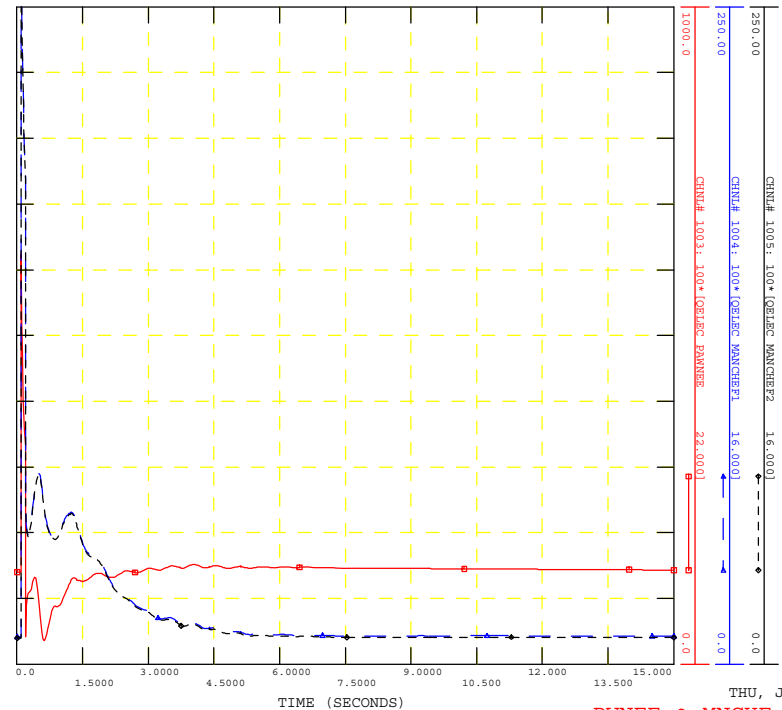


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNER 230 KV ON BRICK CENTER 230 KV LINE
 PANNER CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\hour\NCI12_MWTI_OFF.out



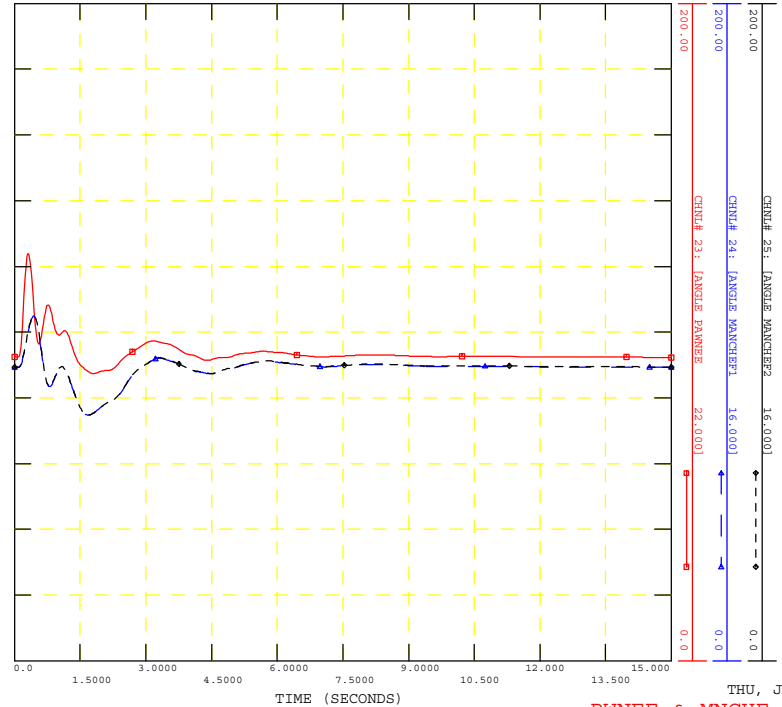
THU, JAN 19 2012 11:53
PWNEE & MNCHF, PELEC (MW)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNER 230 KV ON BRICK CENTER 230 KV LINE
 PANNER CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\hour\NCI12_MWTI_OFF.out



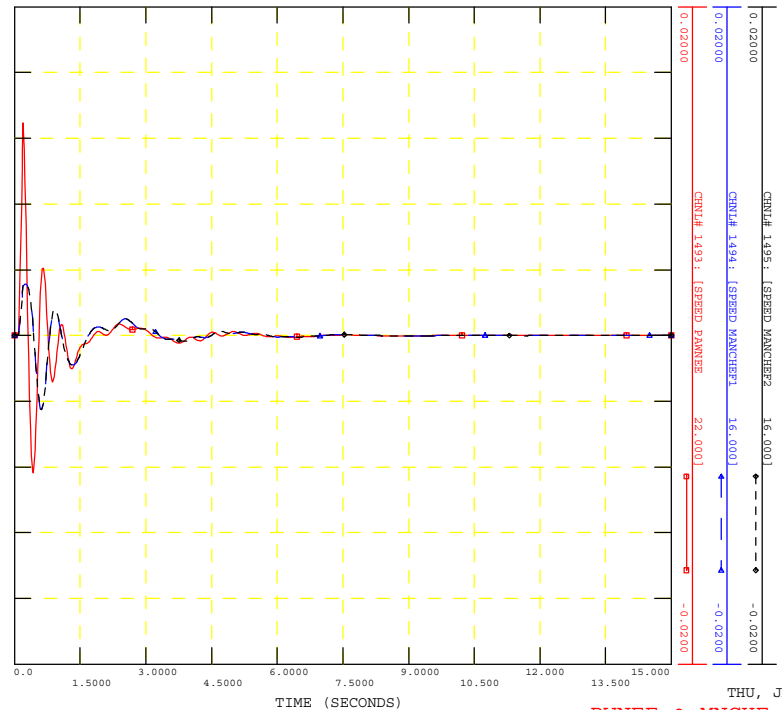
THU, JAN 19 2012 11:53
PWNEE & MNCHF, QELEC (MVAR)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNER 230 KV ON BRICK CENTER 230 KV LINE
 PANNER CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\hour\NCI12_MWTI_OFF.out

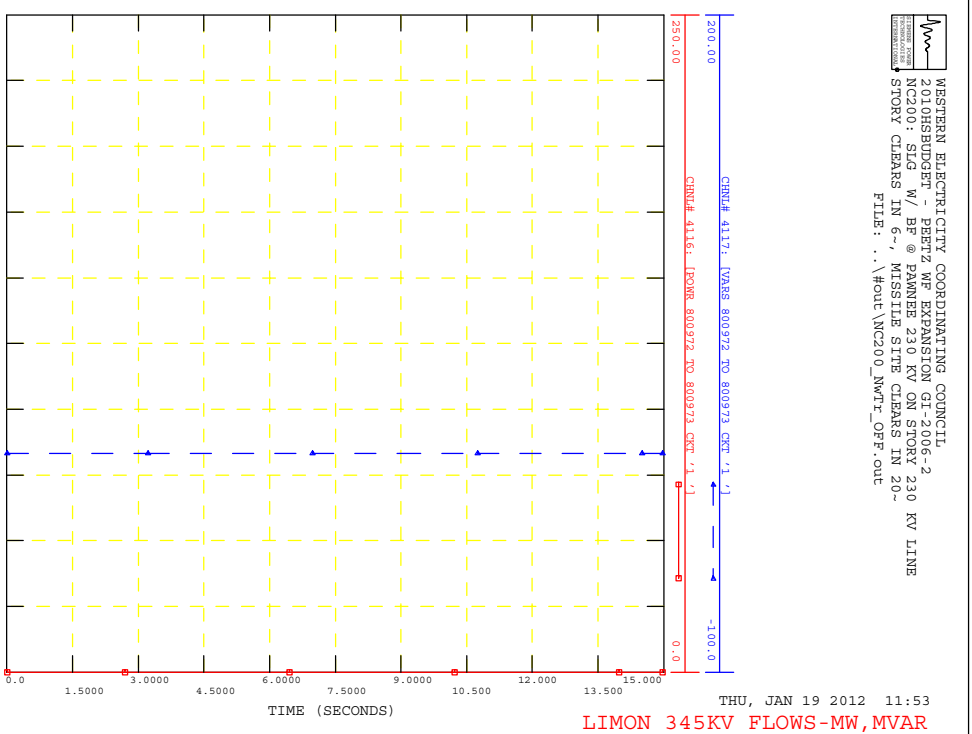
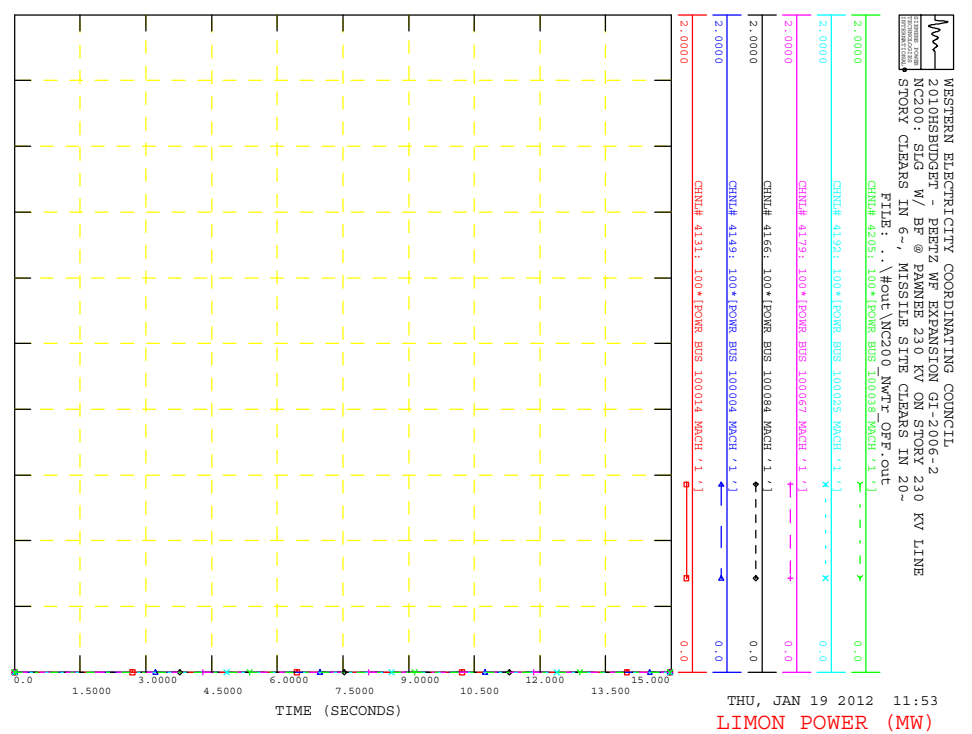
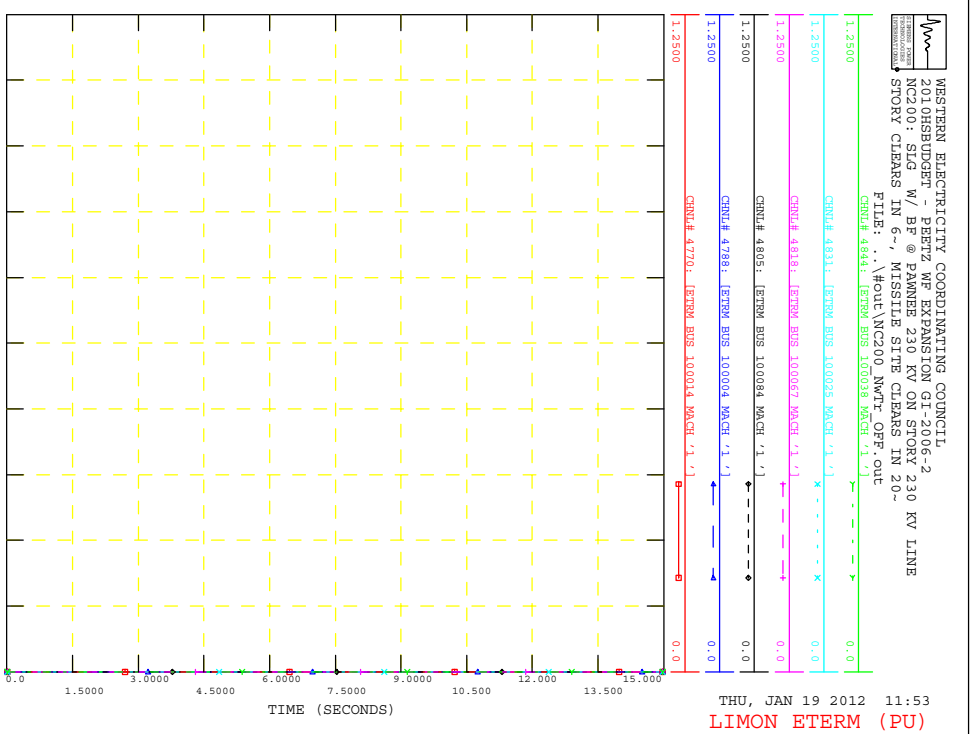
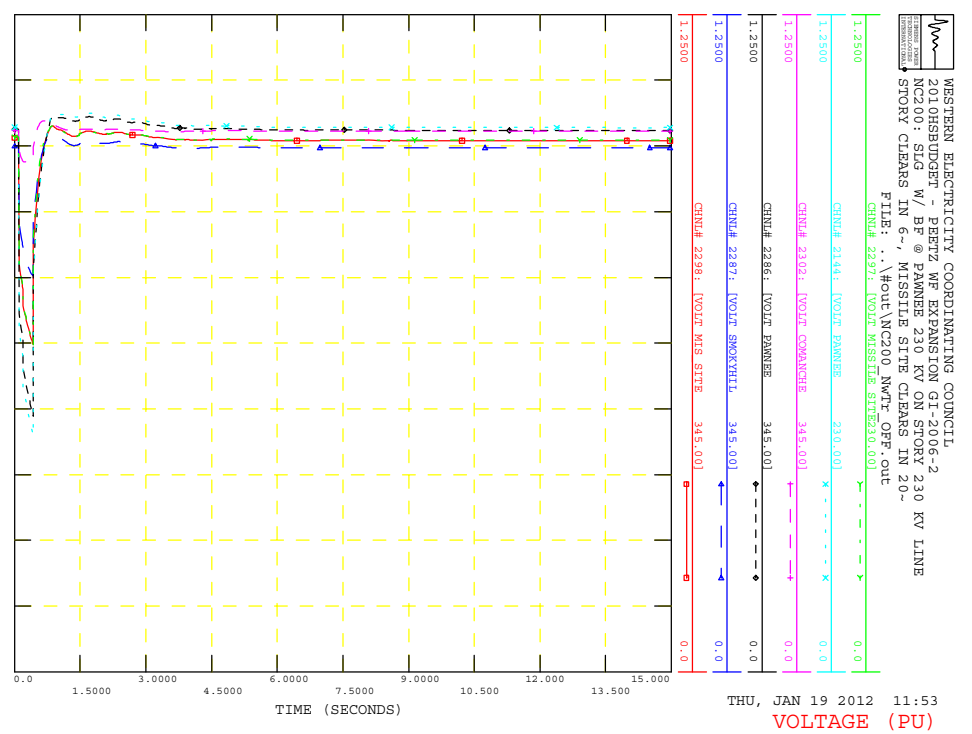


THU, JAN 19 2012 11:53
PWNEE & MNCHF, ANGLE (DEG)

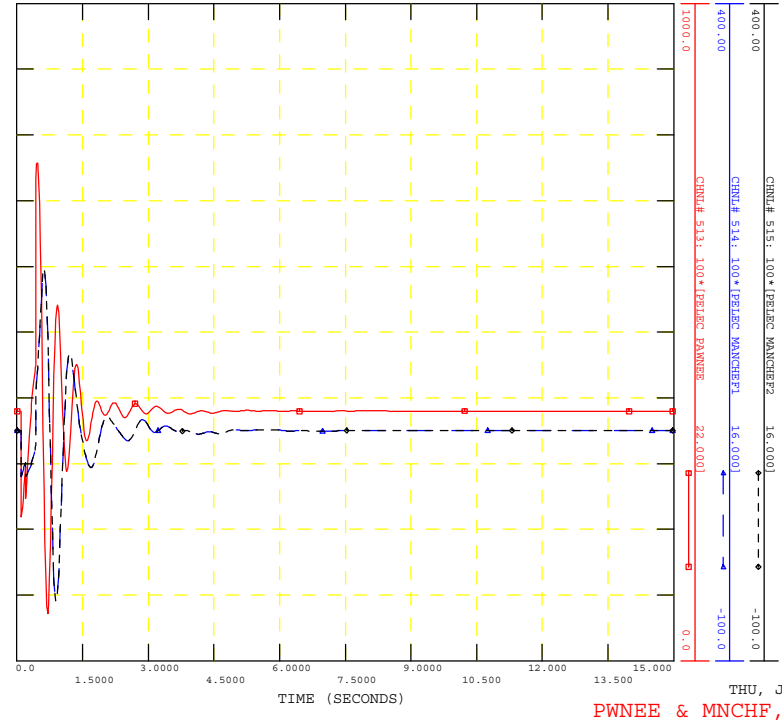
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNER 230 KV ON BRICK CENTER 230 KV LINE
 PANNER CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\hour\NCI12_MWTI_OFF.out



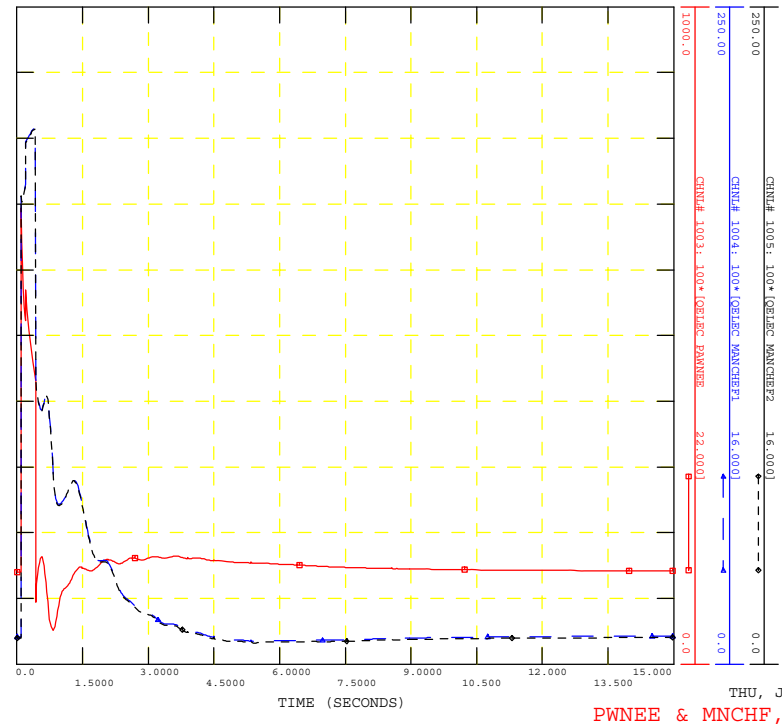
THU, JAN 19 2012 11:53
PWNEE & MNCHF, SPDEV (PU)



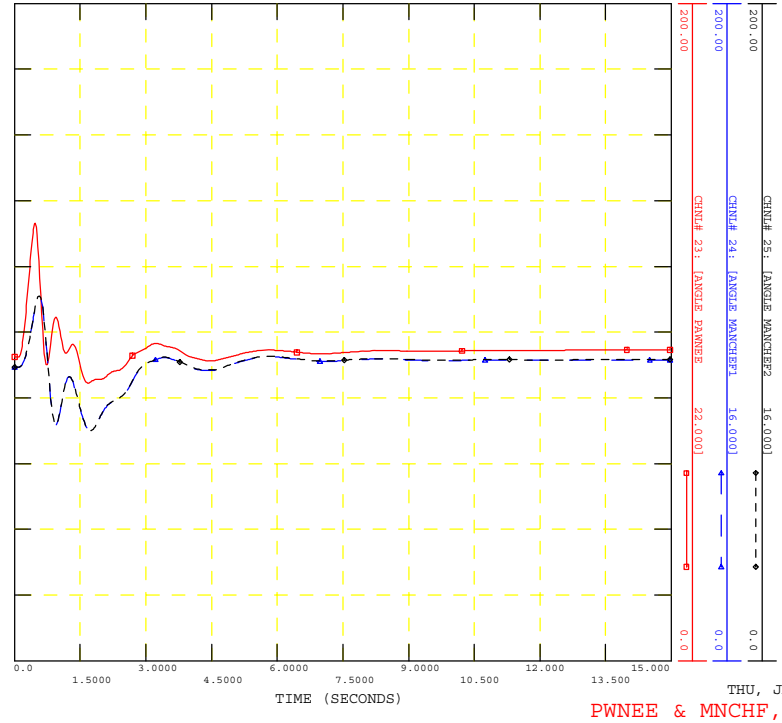
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_MWTE_OFF.out



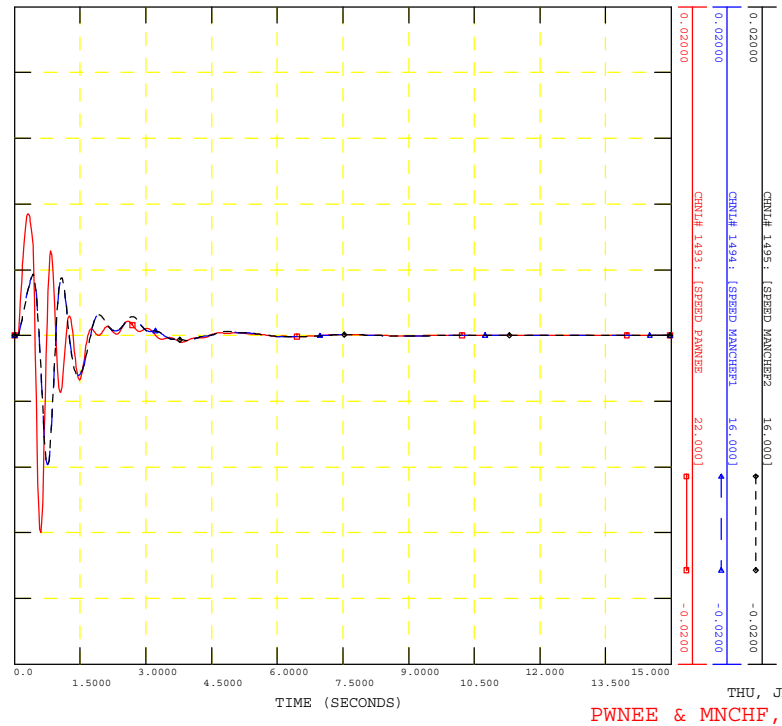
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_MWTE_OFF.out

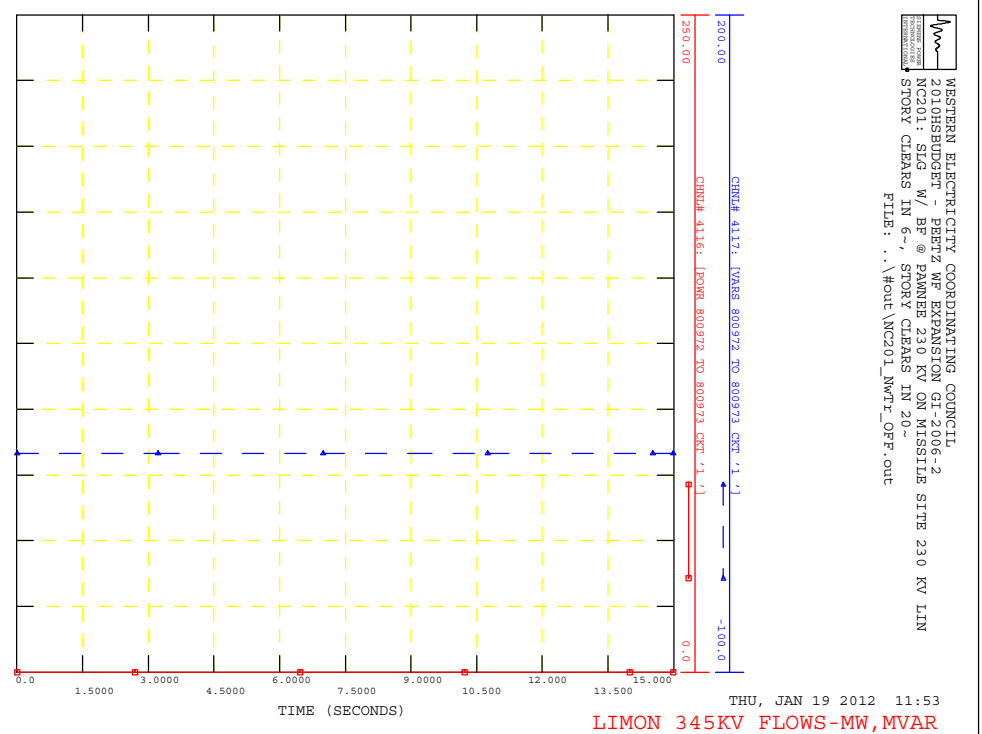
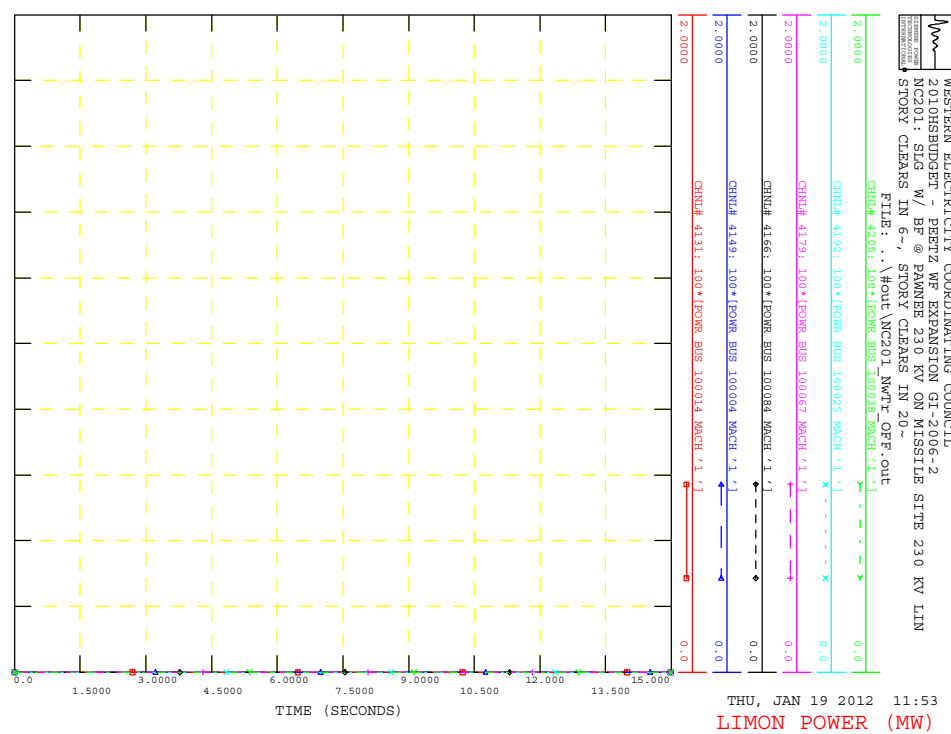
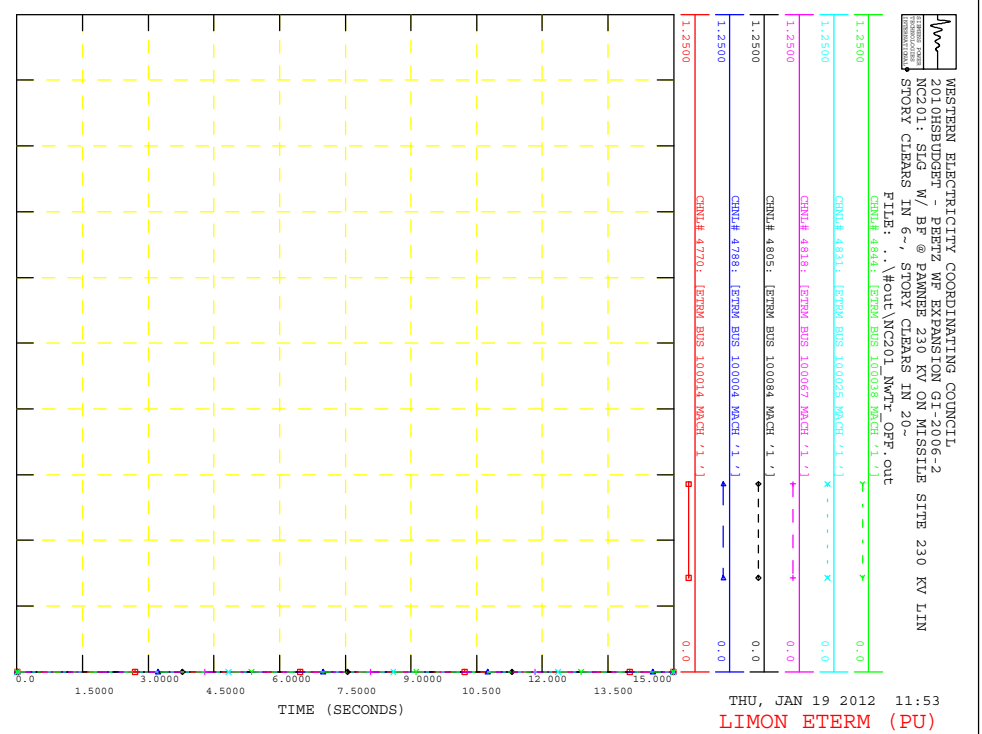
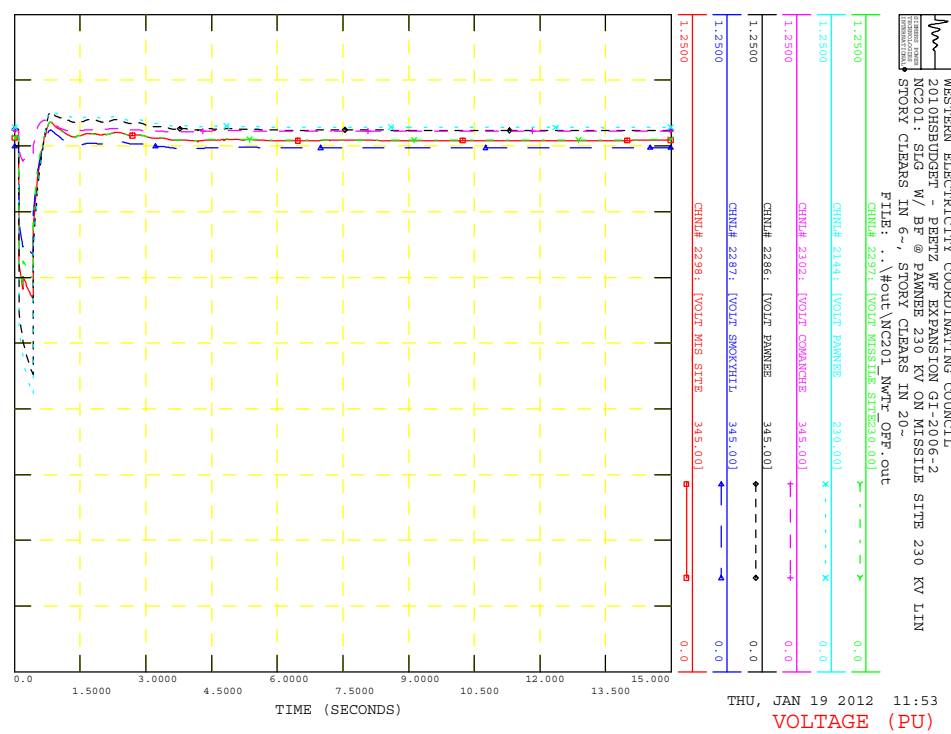


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_MWTE_OFF.out

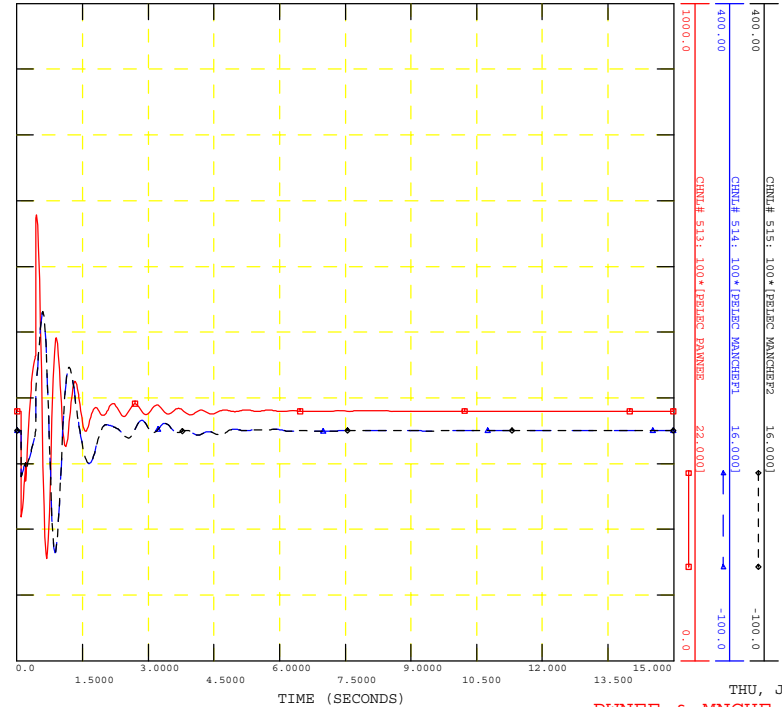


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_MWTE_OFF.out



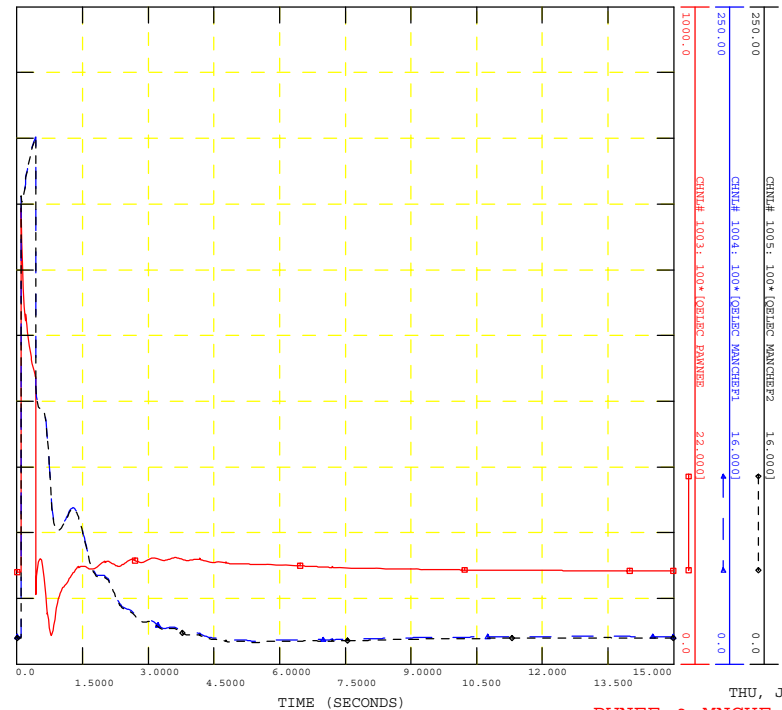


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_MWTE_OFF.out



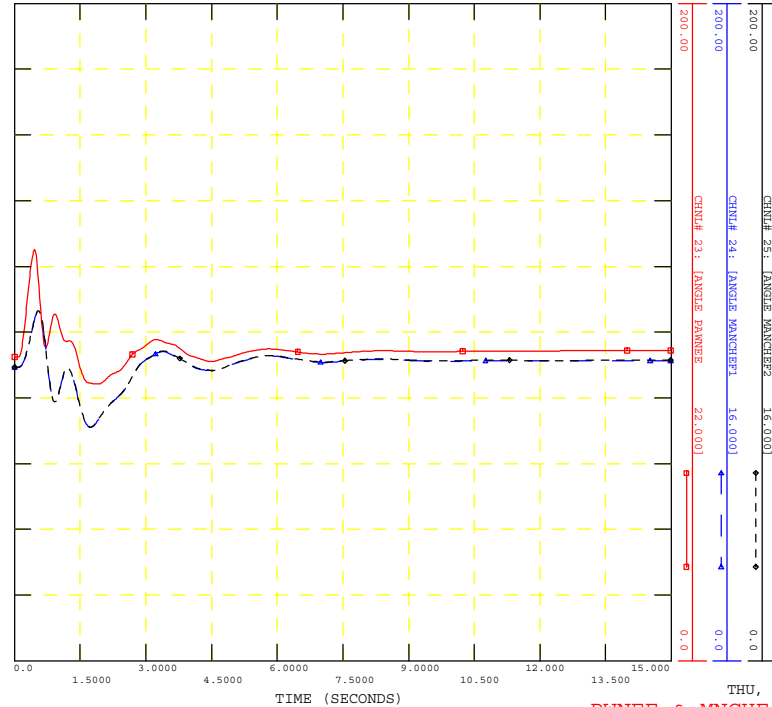
THU, JAN 19 2012 11:53
 PWNEE & MNCHF, PELEC (MW)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_MWTE_OFF.out



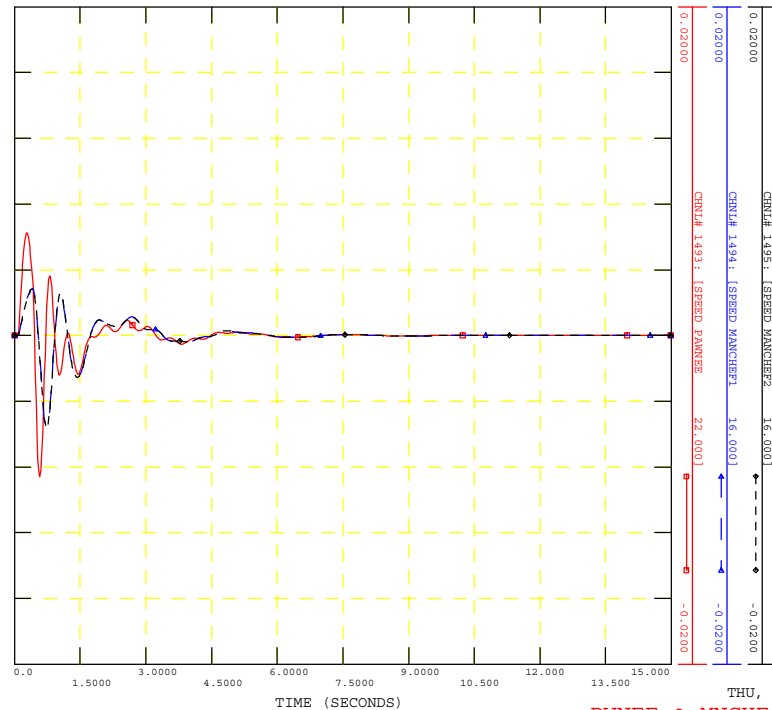
THU, JAN 19 2012 11:53
 PWNEE & MNCHF, QELEC (MVAR)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_MWTE_OFF.out

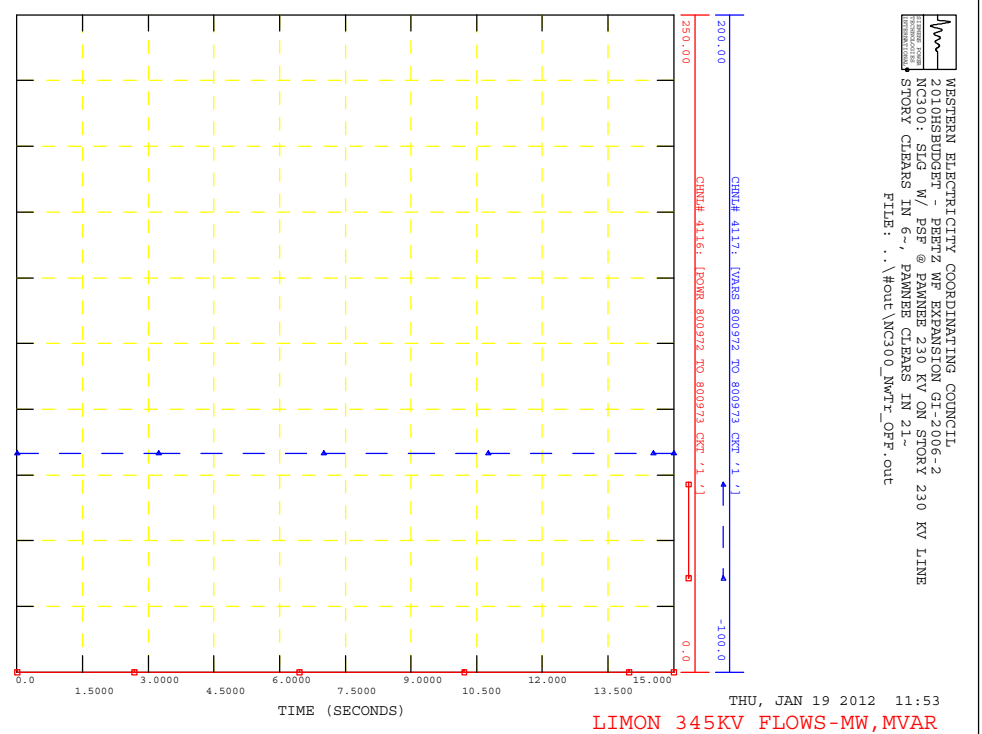
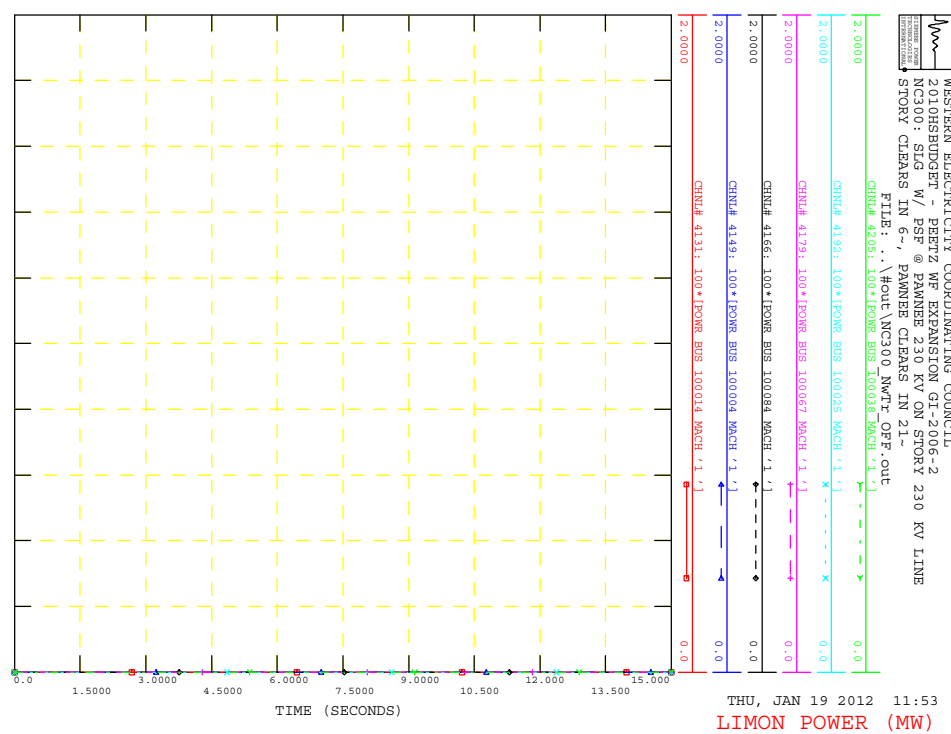
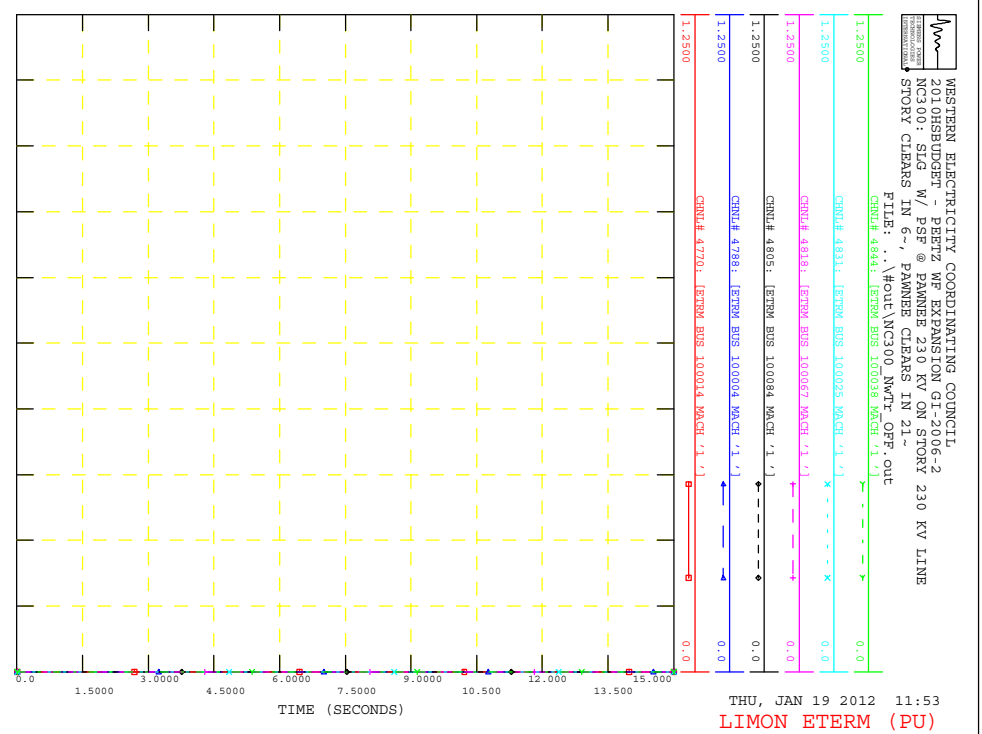
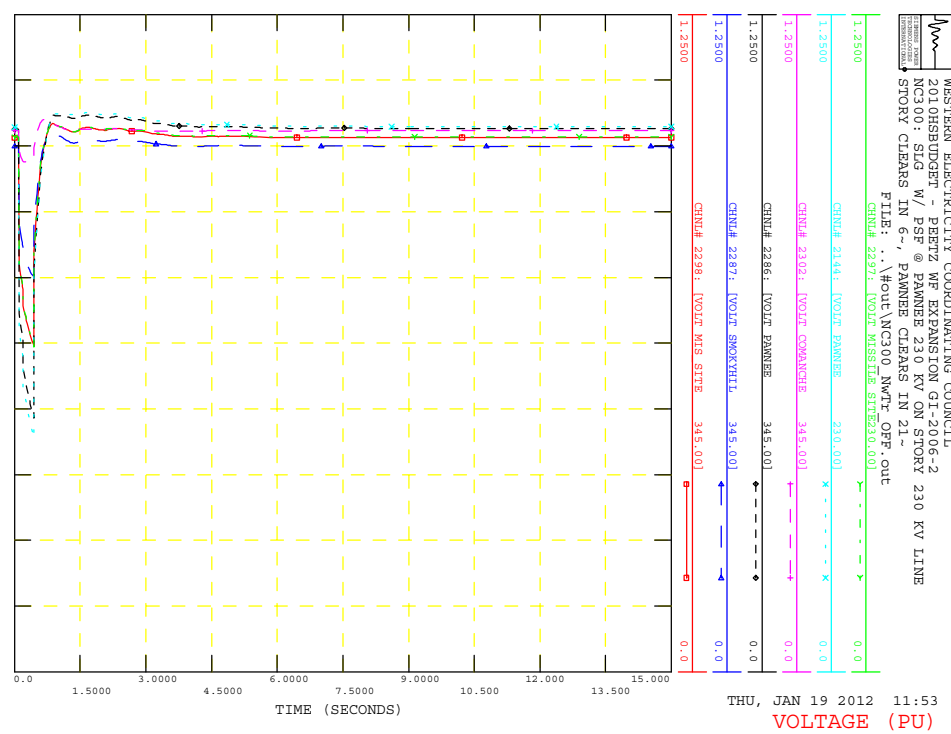


THU, JAN 19 2012 11:53
 PWNEE & MNCHF, ANGLE (DEG)

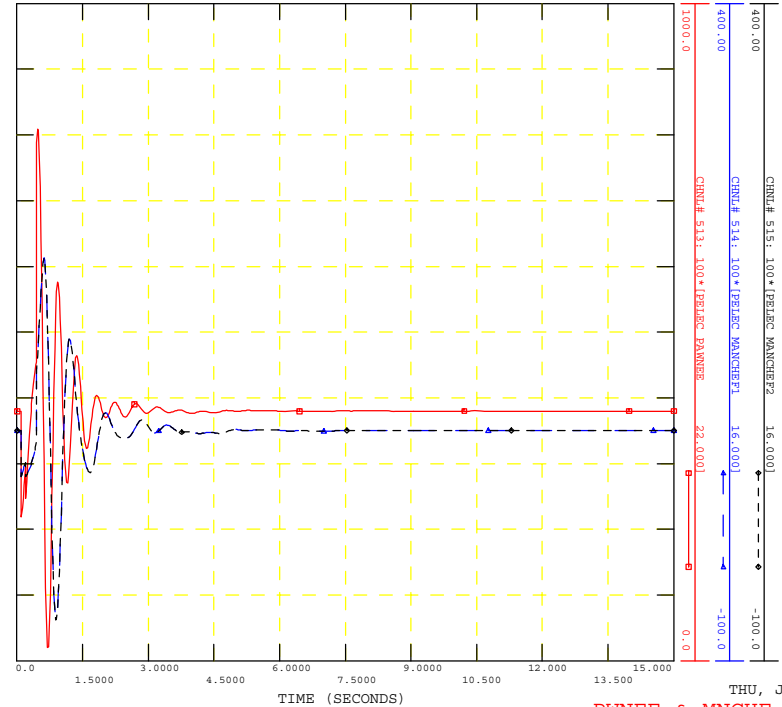
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_MWTE_OFF.out



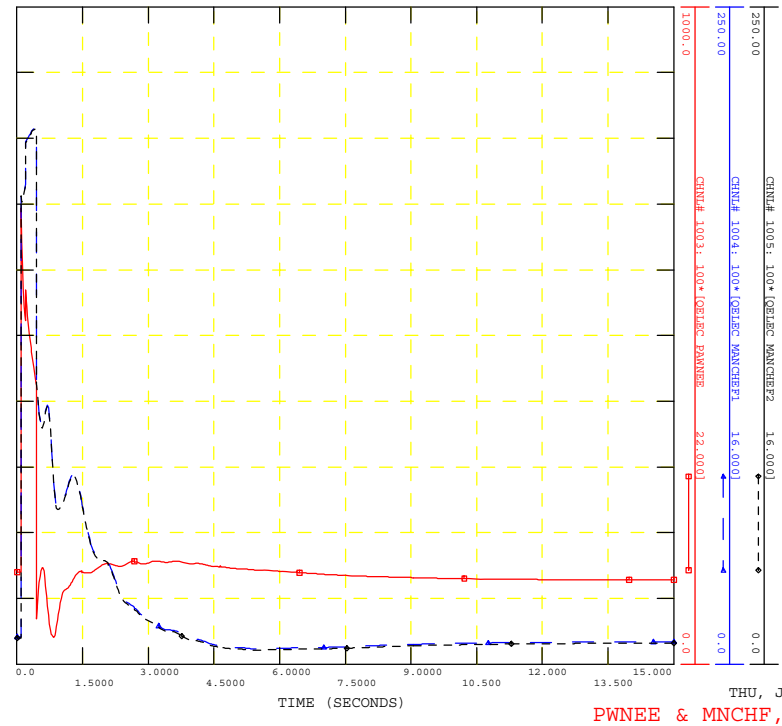
THU, JAN 19 2012 11:53
 PWNEE & MNCHF, SPDEV (PU)



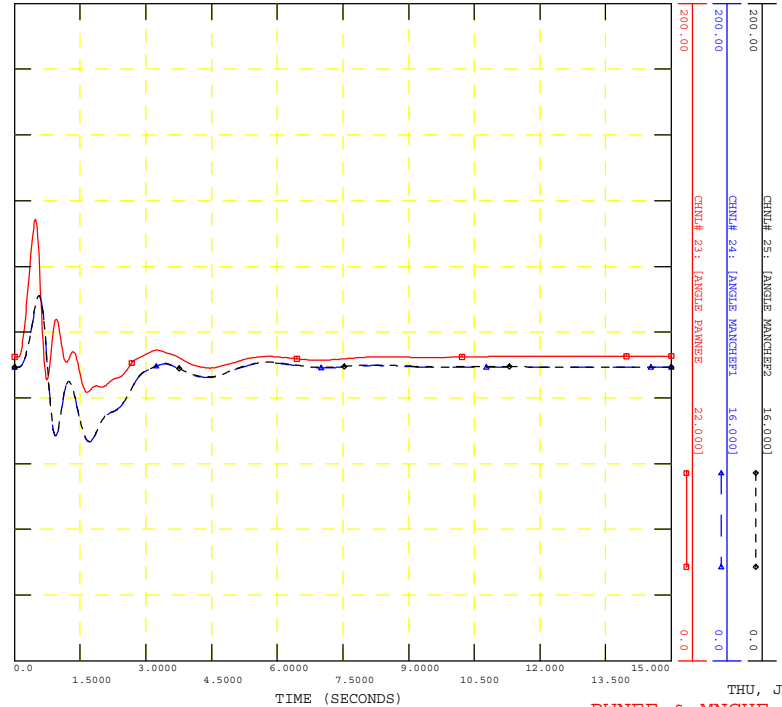
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_MWLT_OFF.out



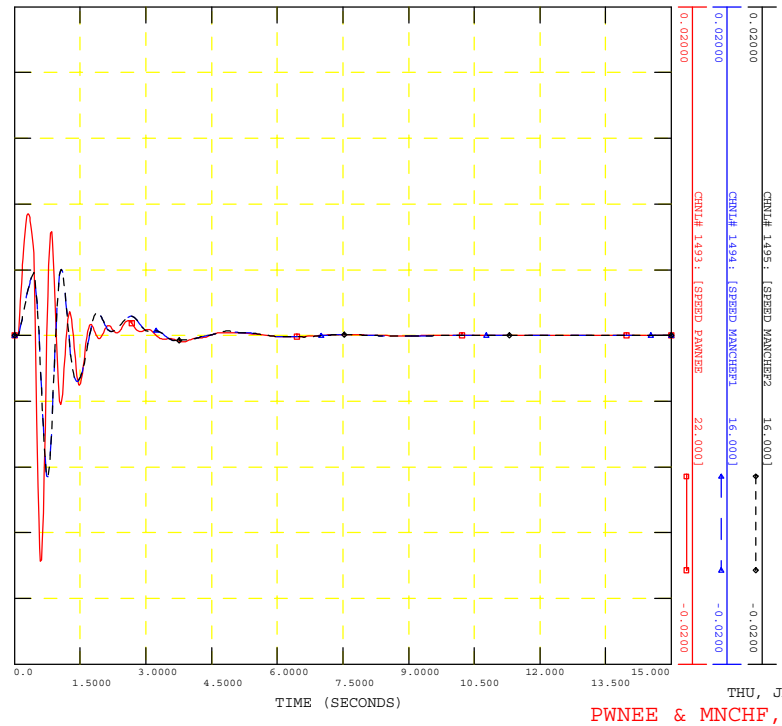
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_MWLT_OFF.out

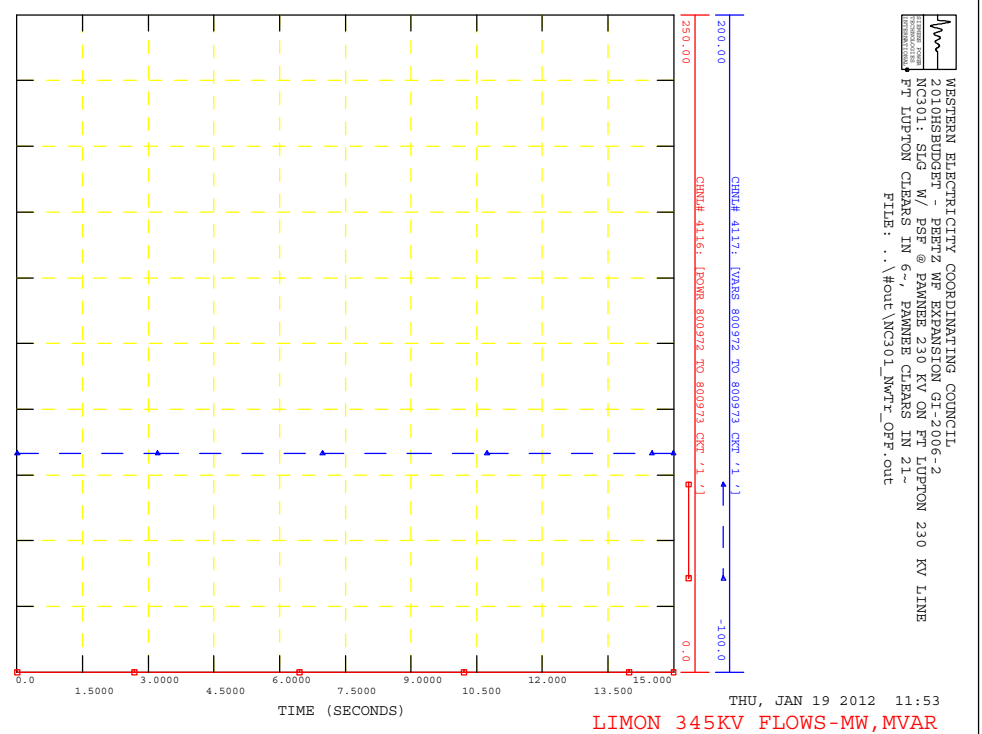
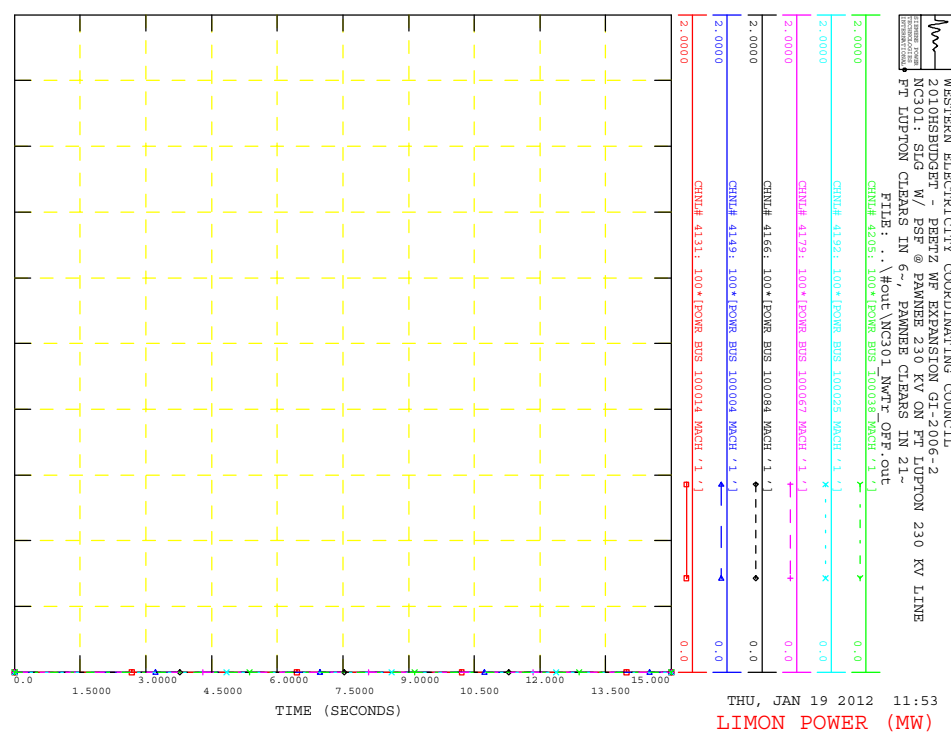
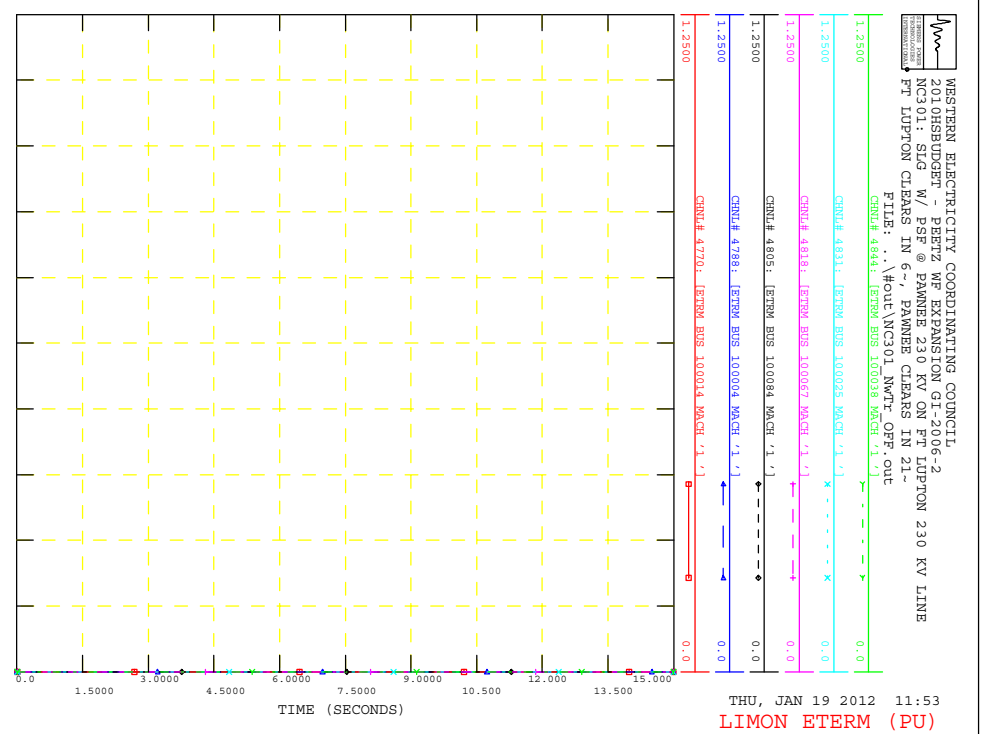
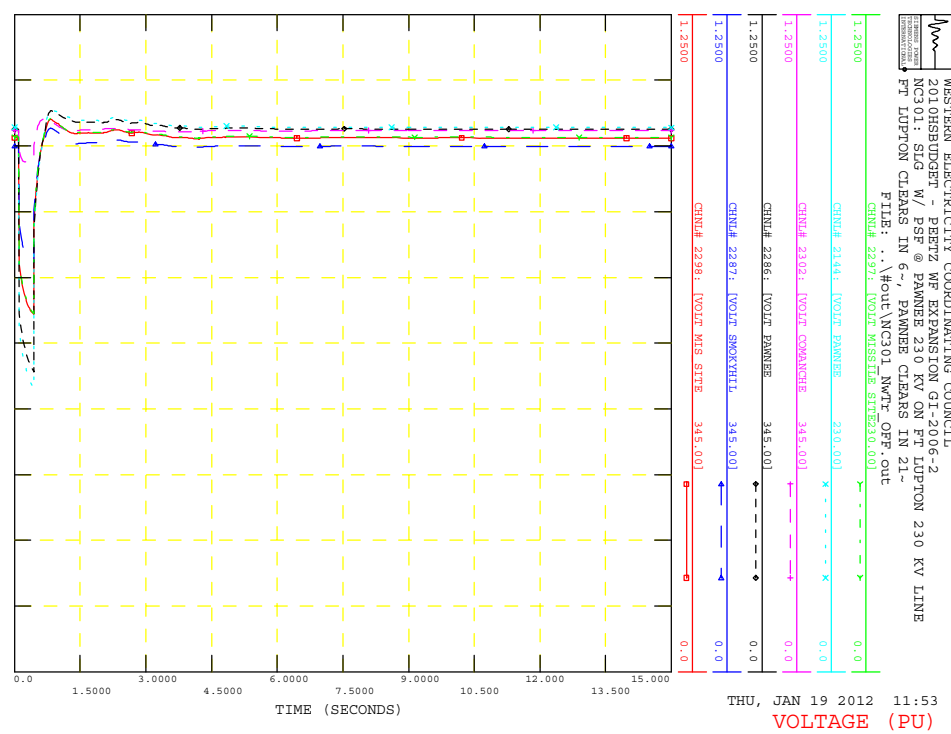


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_MWLT_OFF.out

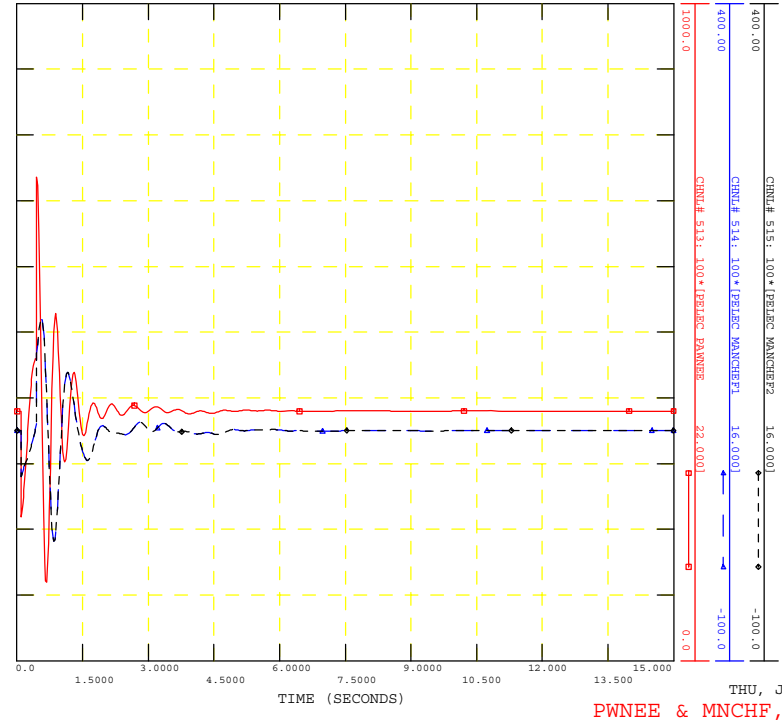


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_MWLT_OFF.out

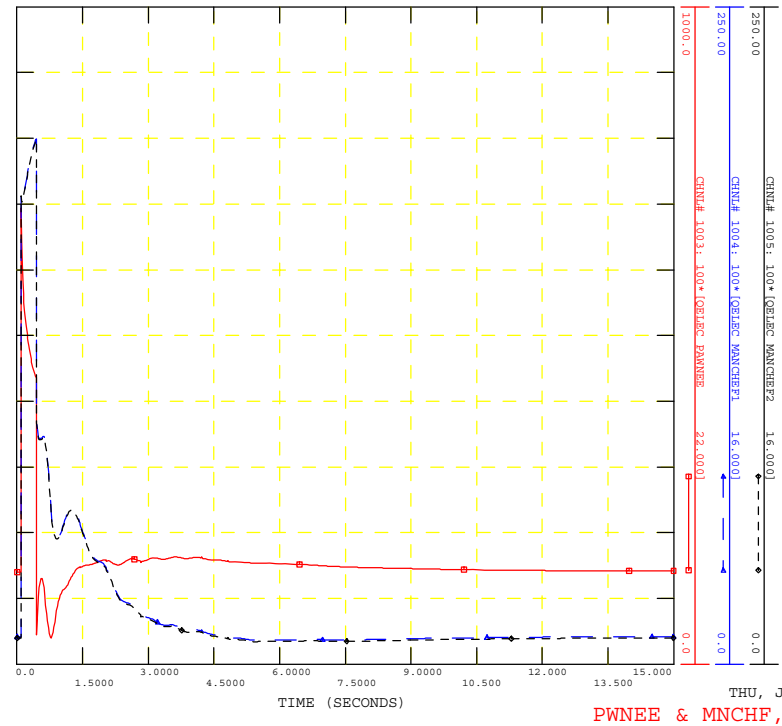




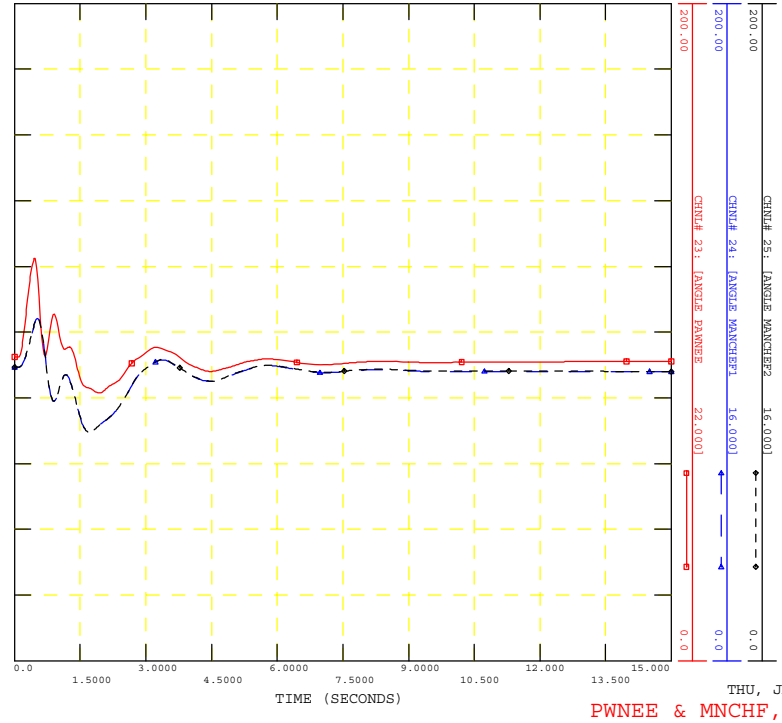
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PAMNNE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PAMNNE CLEARS IN 21"
 FILE: ..\Hour\NC301_MWTF_OFF.out



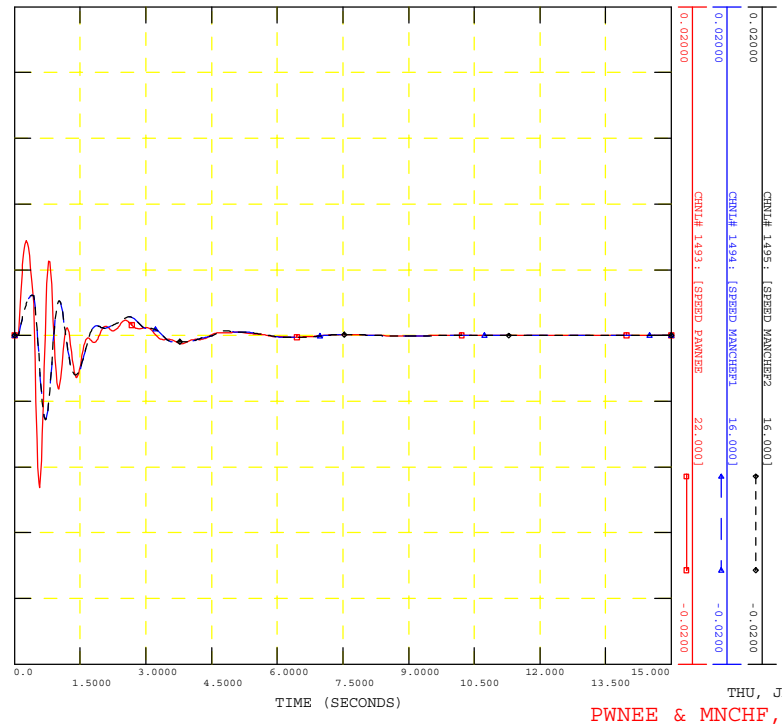
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PAMNNE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PAMNNE CLEARS IN 21"
 FILE: ..\Hour\NC301_MWTF_OFF.out

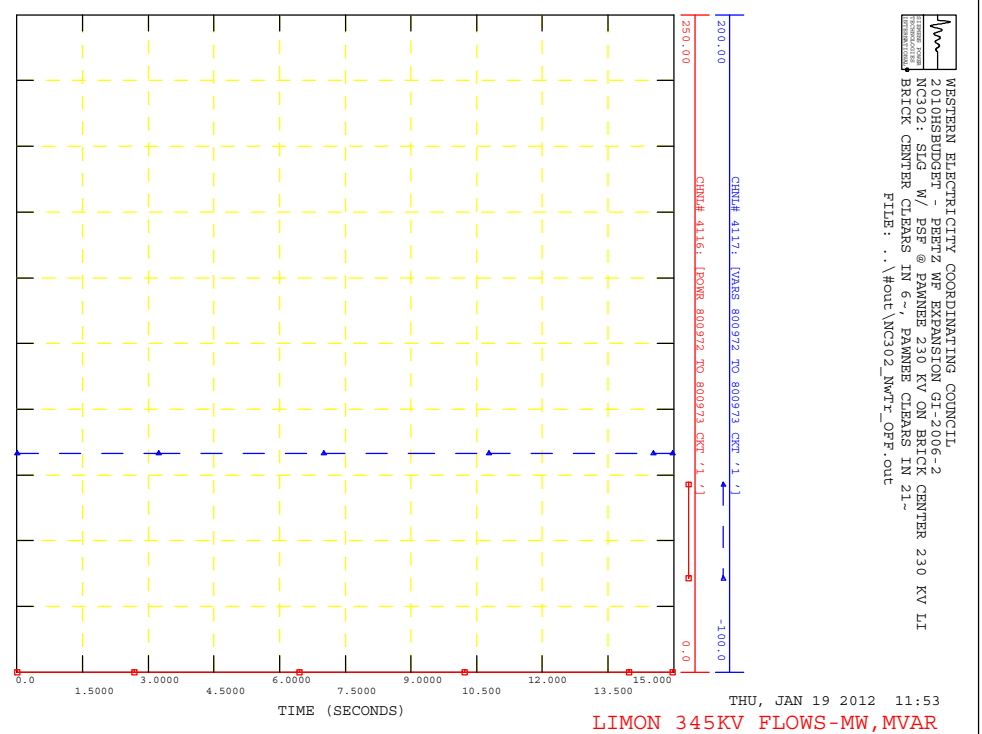
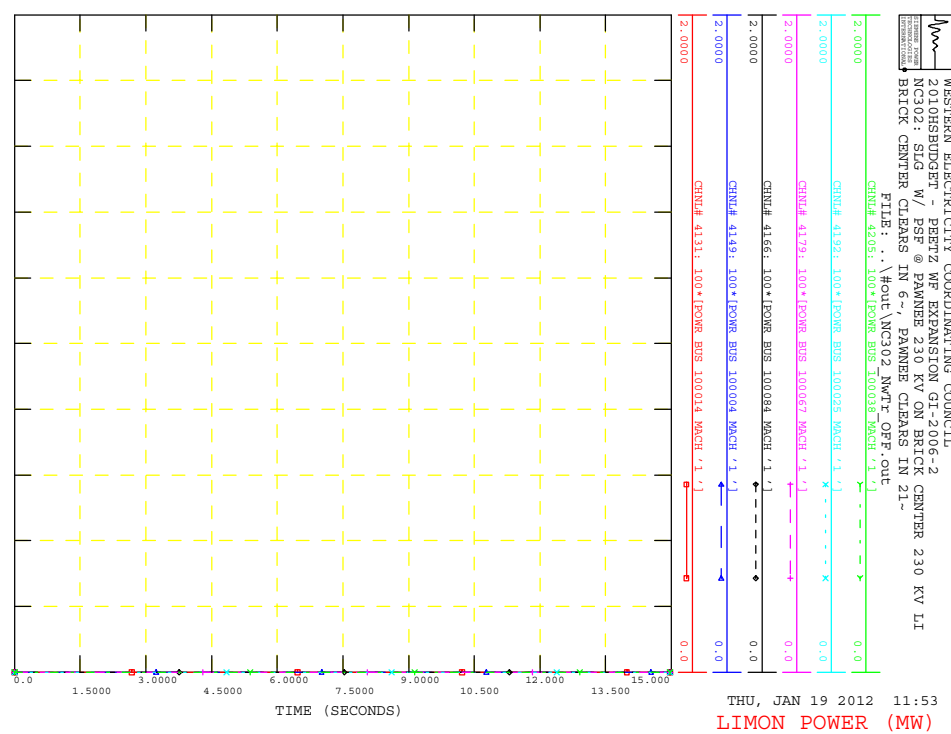
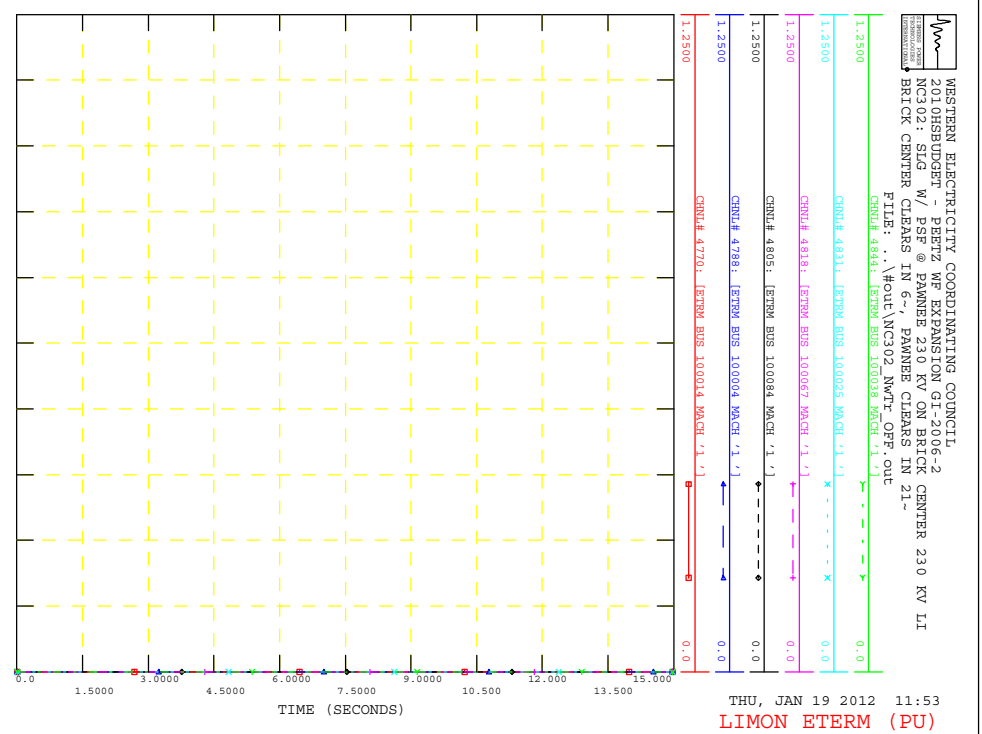
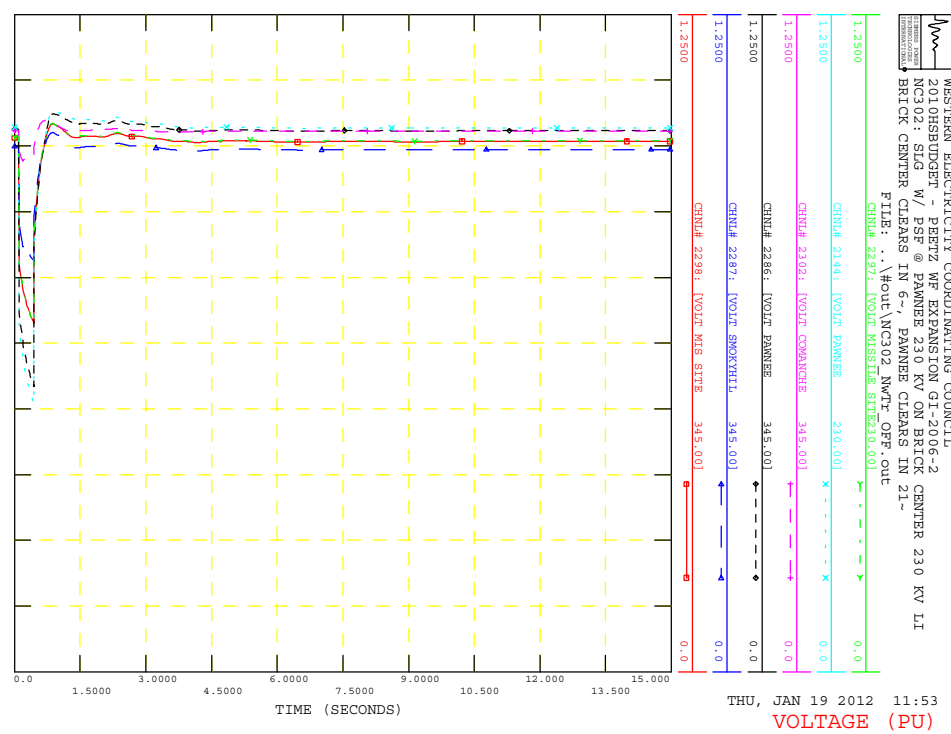


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PAMNNE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PAMNNE CLEARS IN 21"
 FILE: ..\Hour\NC301_MWTF_OFF.out

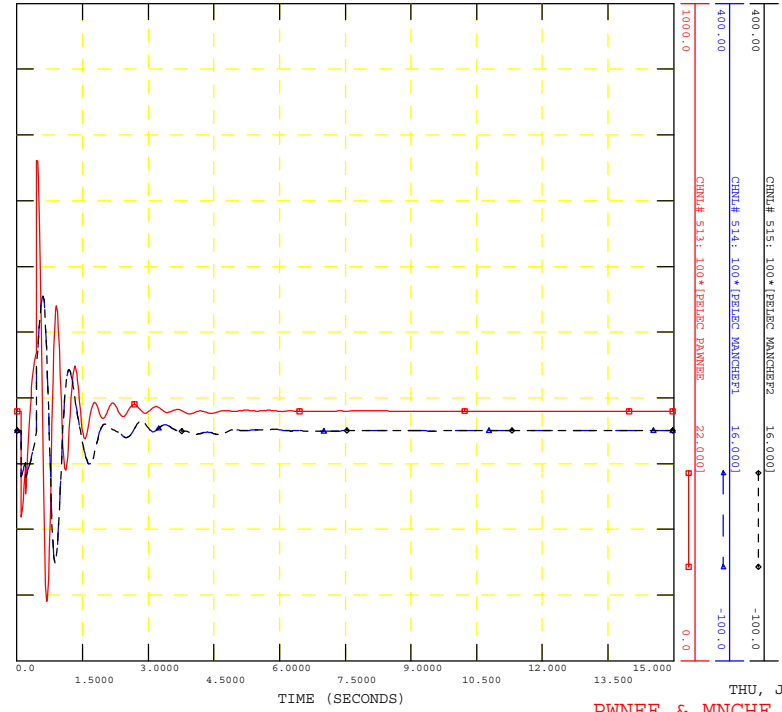


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PAMNNE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PAMNNE CLEARS IN 21"
 FILE: ..\Hour\NC301_MWTF_OFF.out

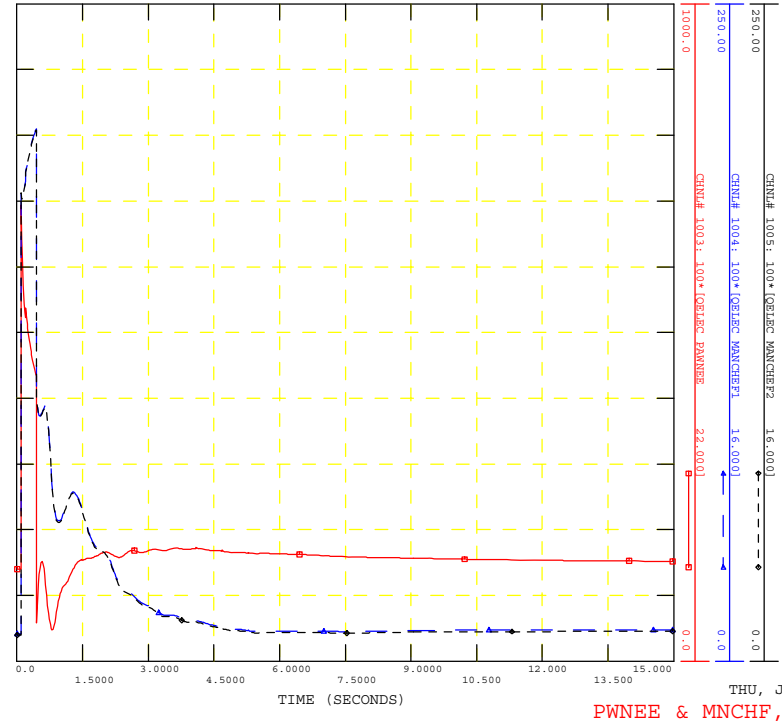




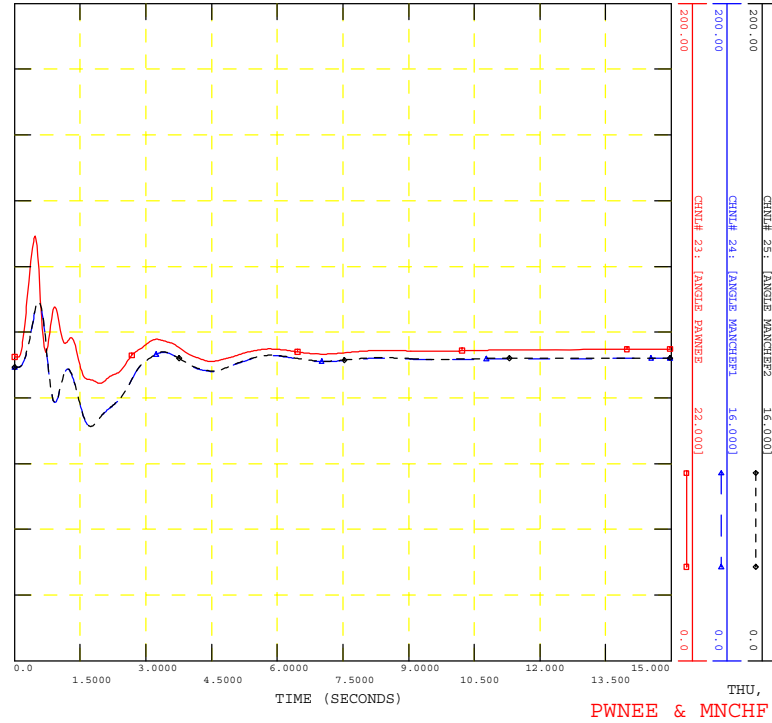
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_MWLT_Off.out



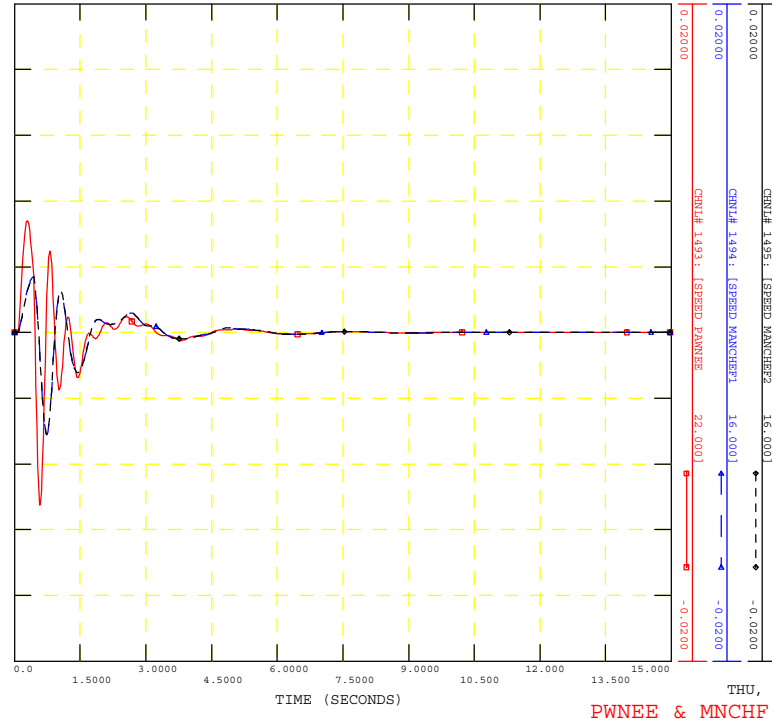
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_MWLT_Off.out



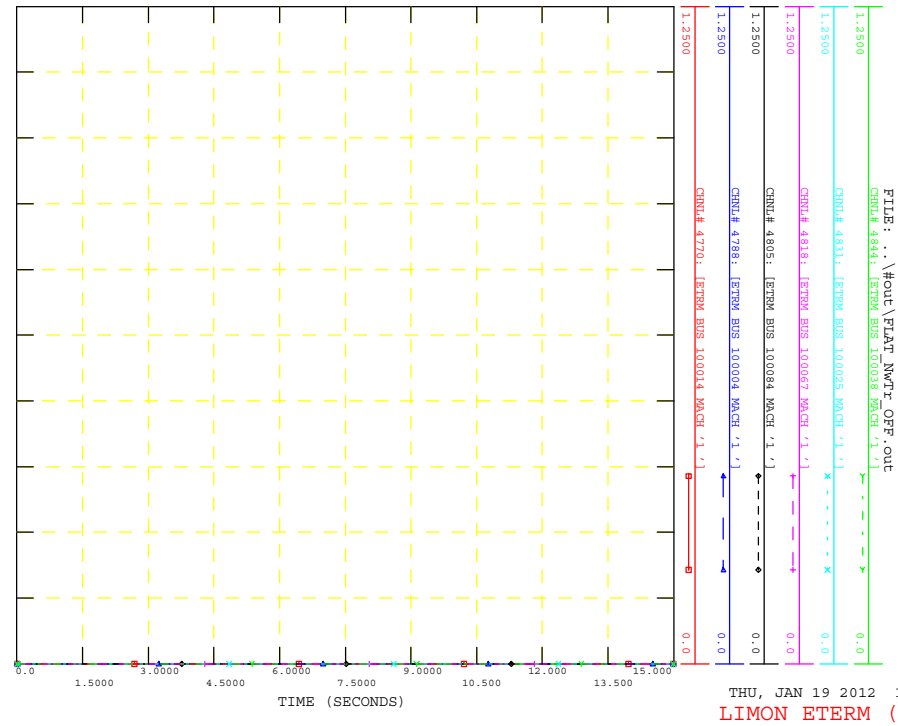
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_MWLT_Off.out



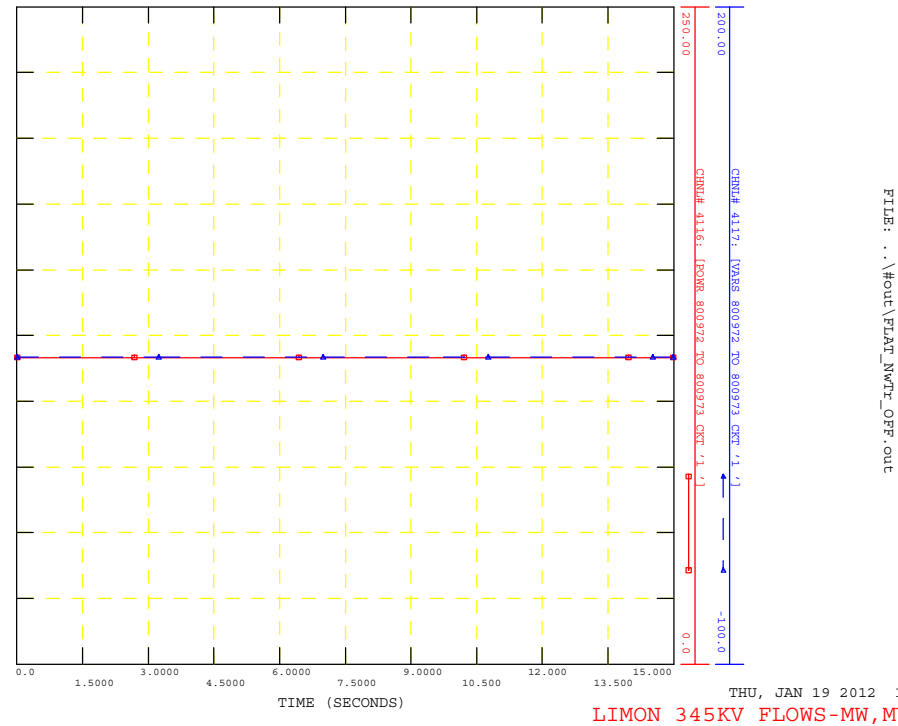
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_MWLT_Off.out



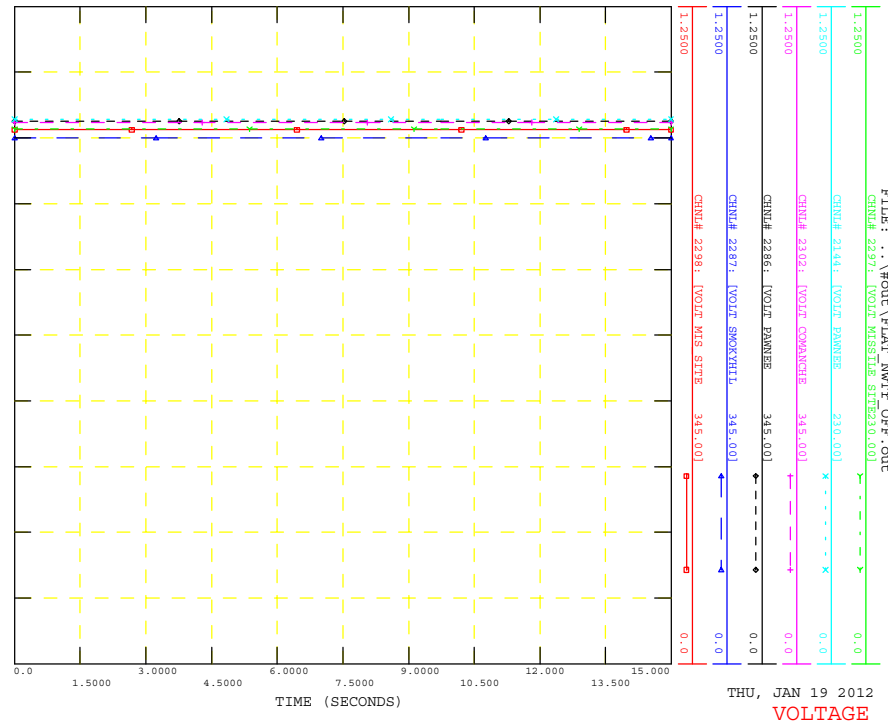
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT
 FILE: ..\#out\FLAT_MWTR_OFF_out



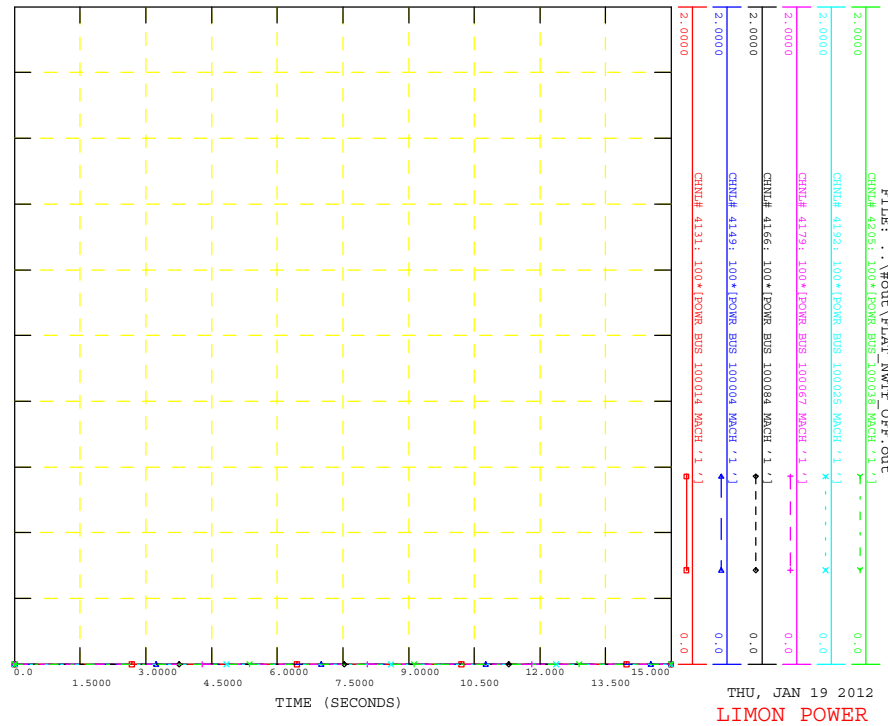
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT
 FILE: ..\#out\FLAT_MWTR_OFF_out

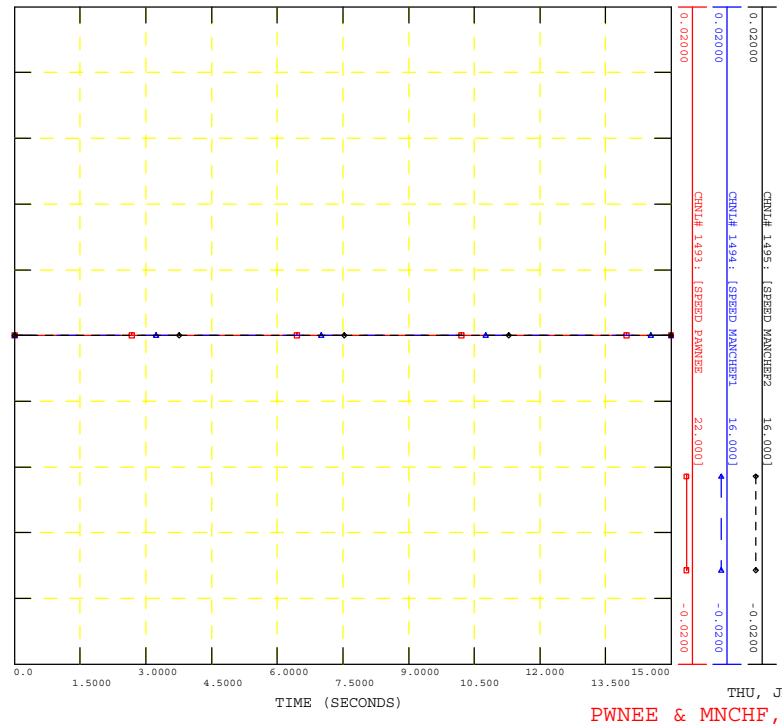
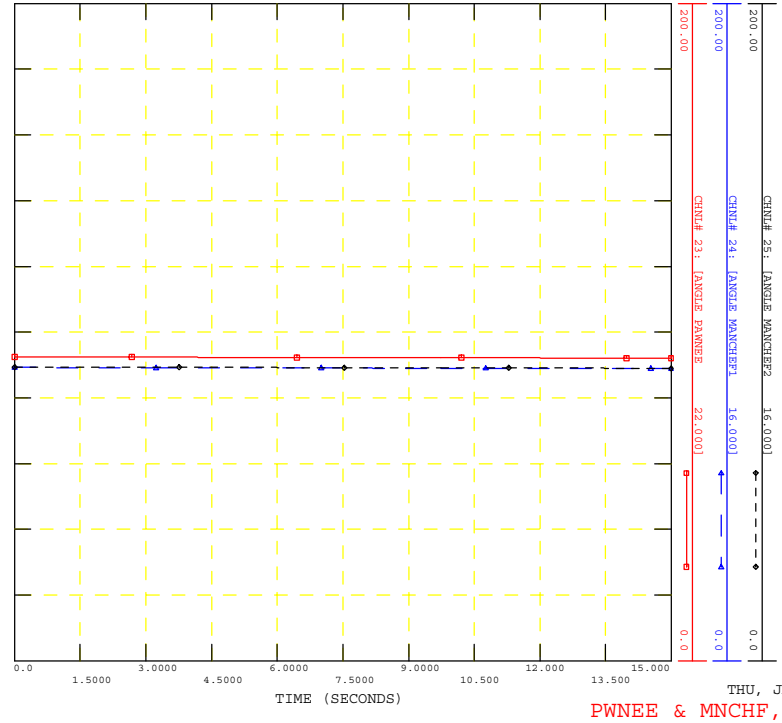
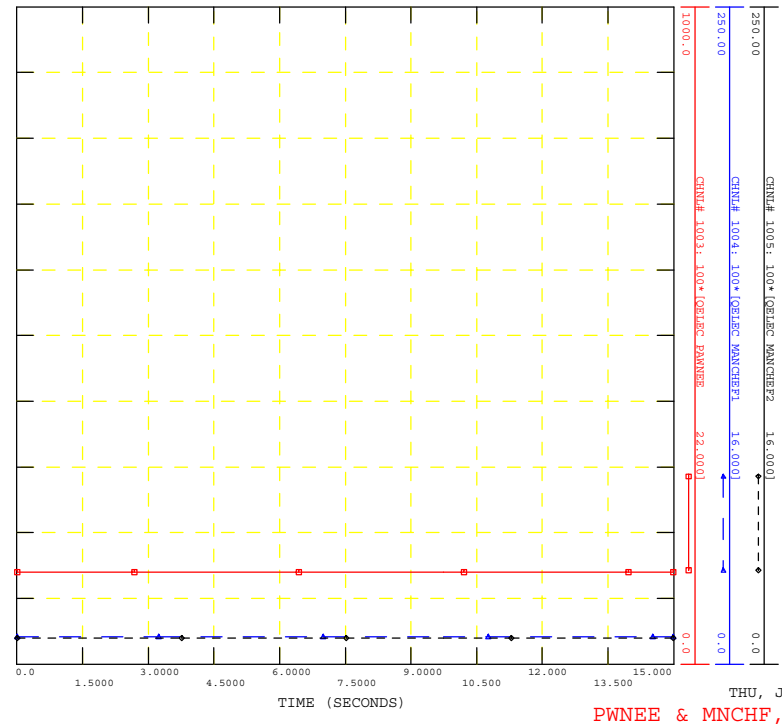
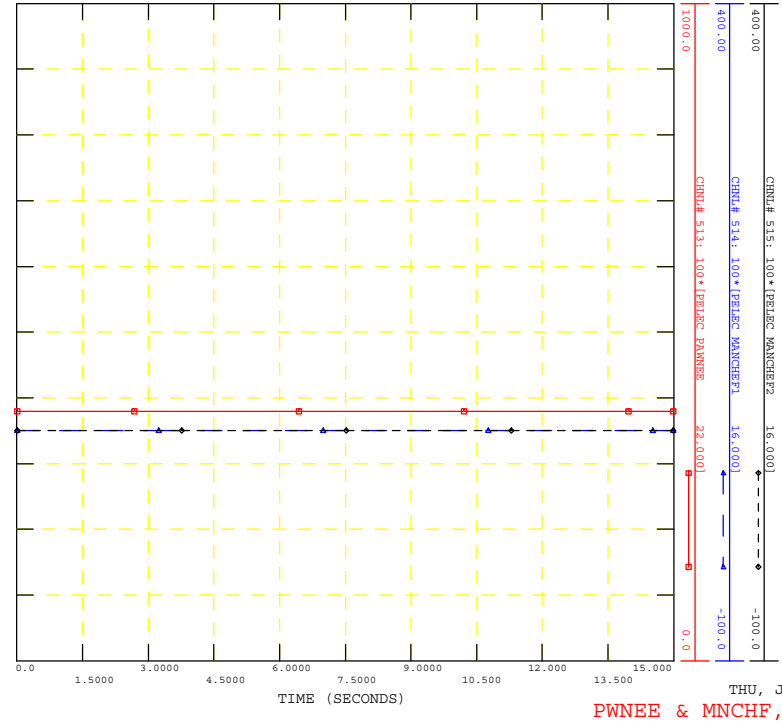


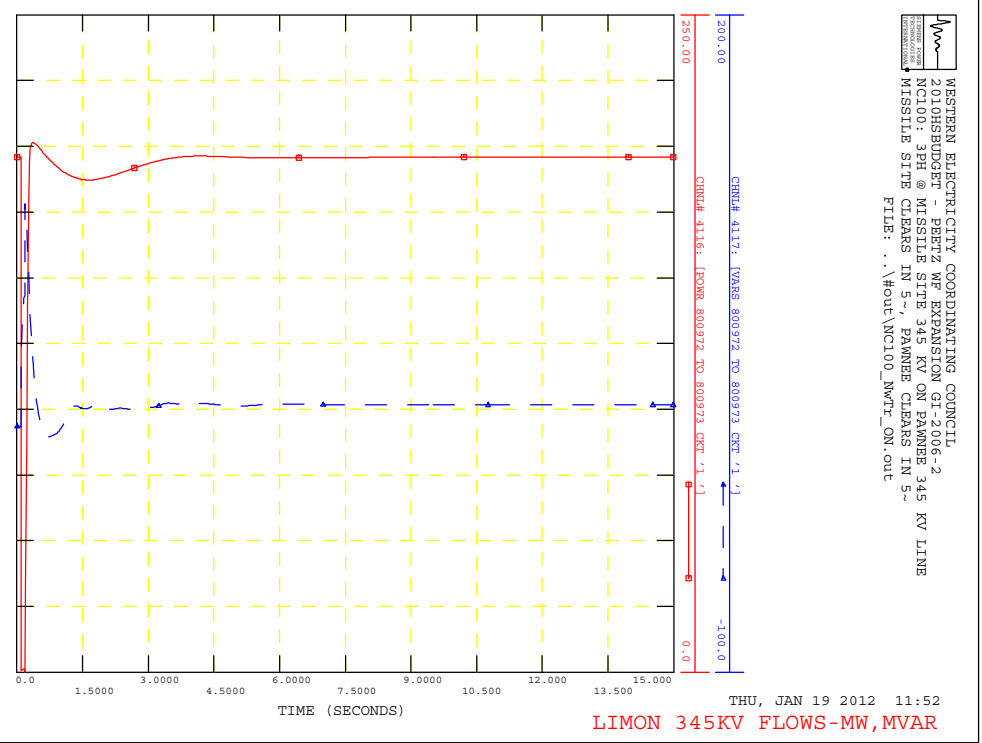
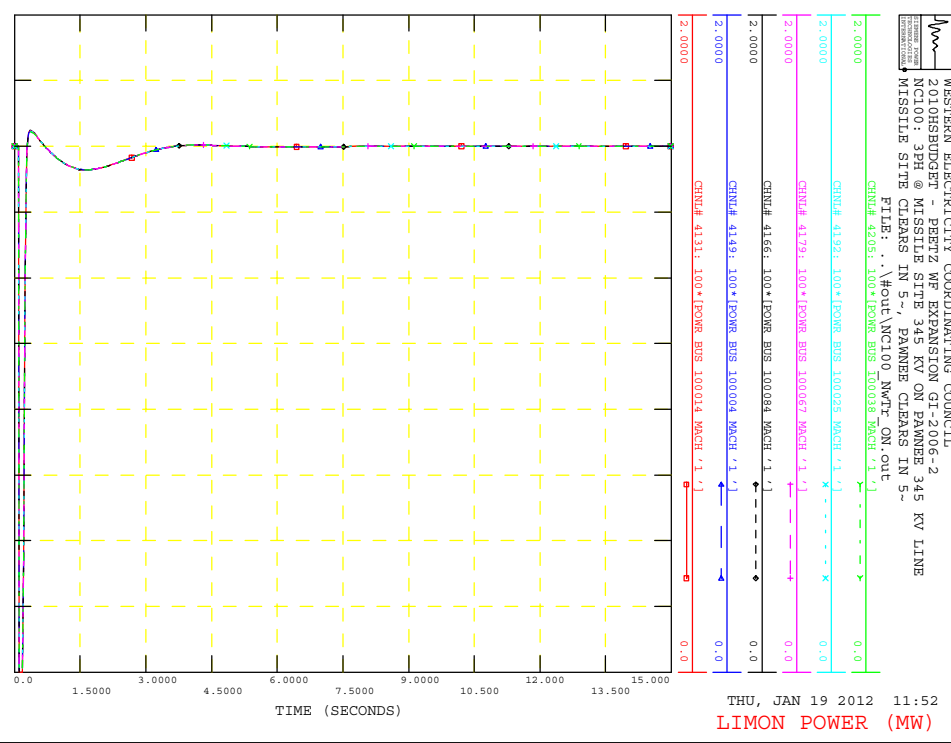
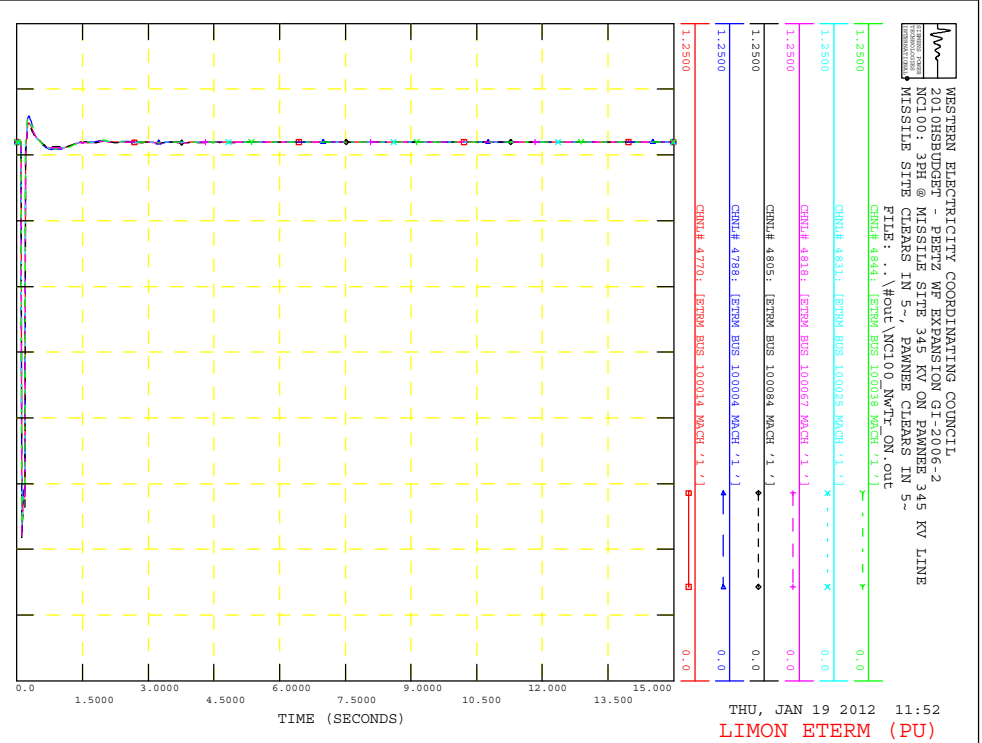
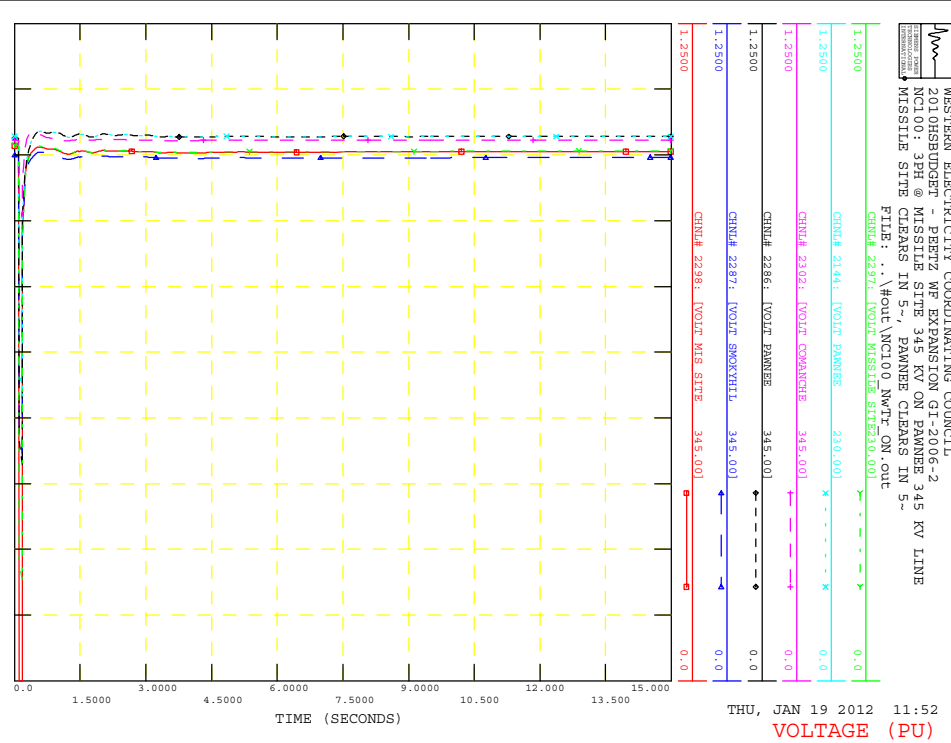
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT
 FILE: ..\#out\FLAT_MWTR_OFF_out



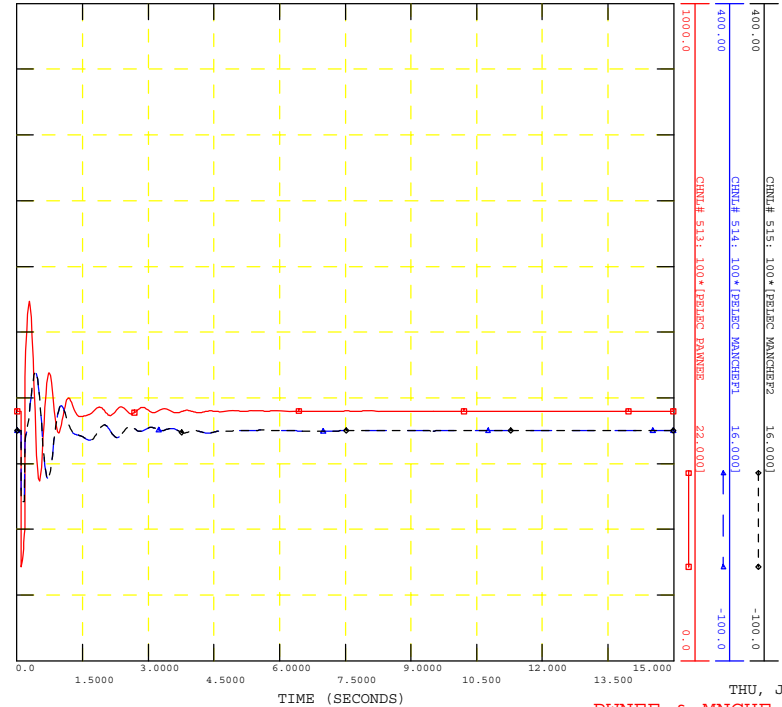
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT
 FILE: ..\#out\FLAT_MWTR_OFF_out





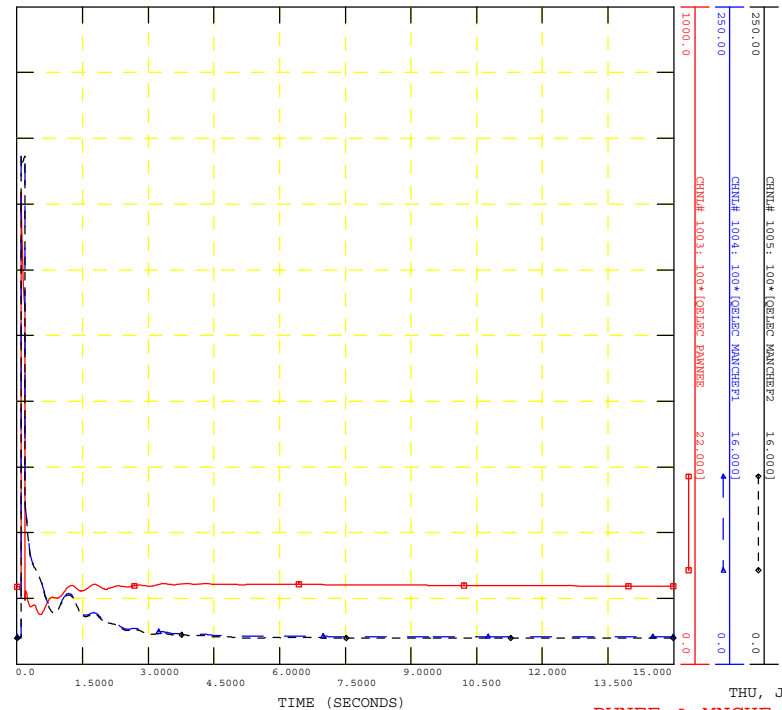


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_mwTr_0N.out



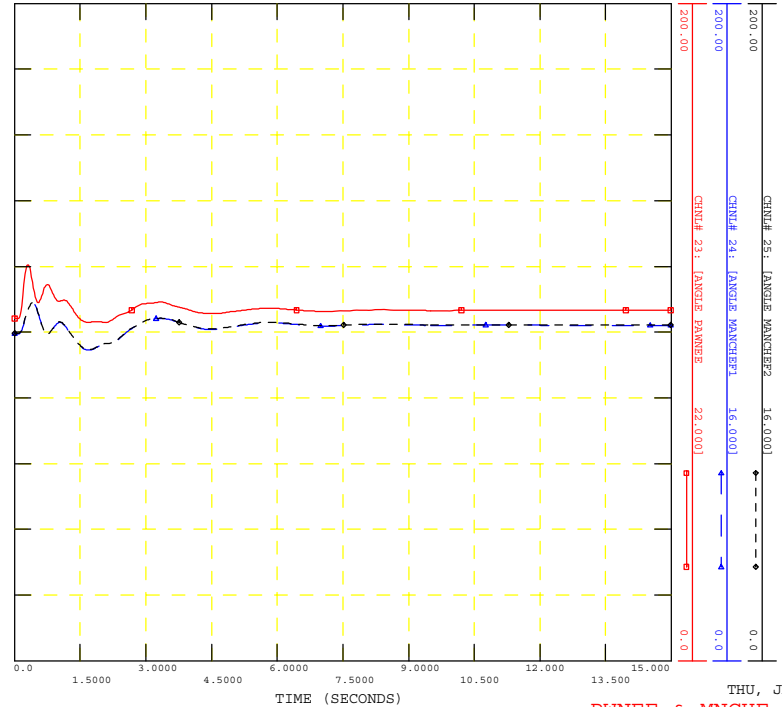
THU, JAN 19 2012 11:52
 PWNEE & MNCHF, PELEC (MW)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_mwTr_0N.out



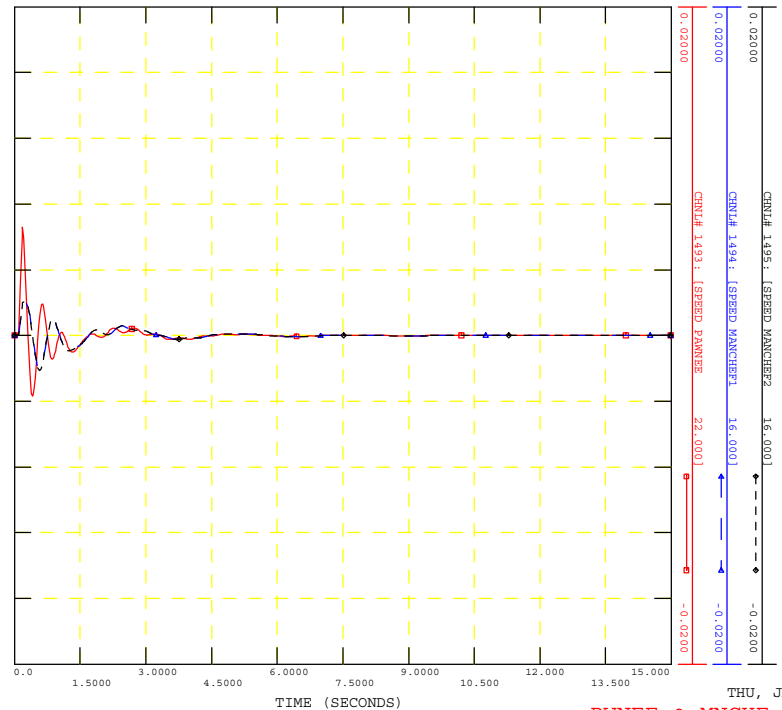
THU, JAN 19 2012 11:52
 PWNEE & MNCHF, QELEC (MVAR)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_mwTr_0N.out

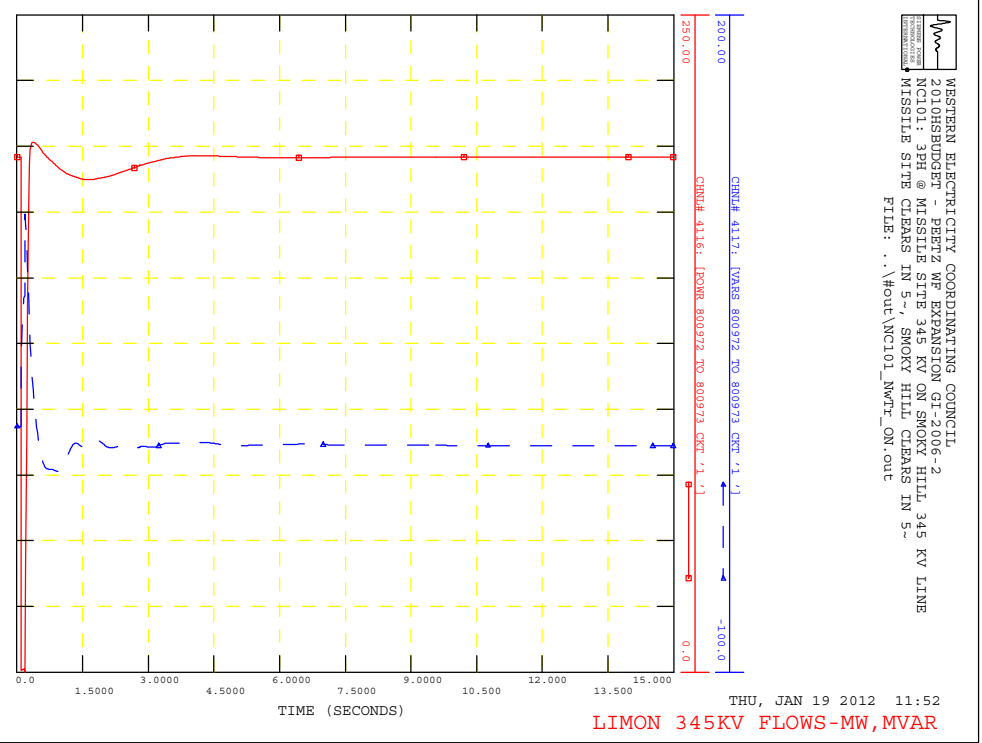
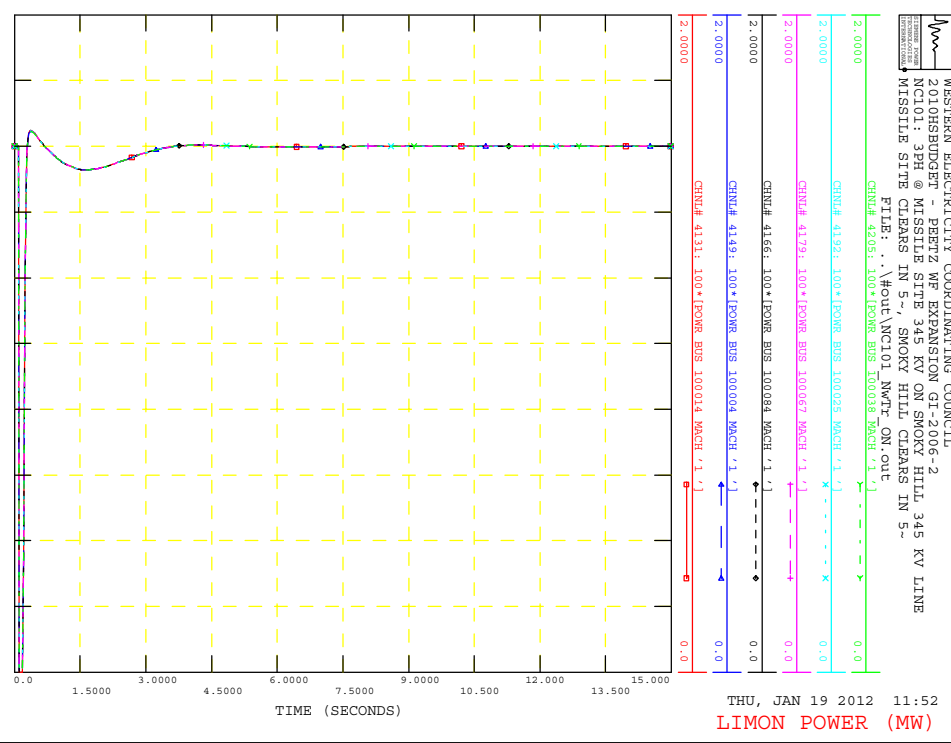
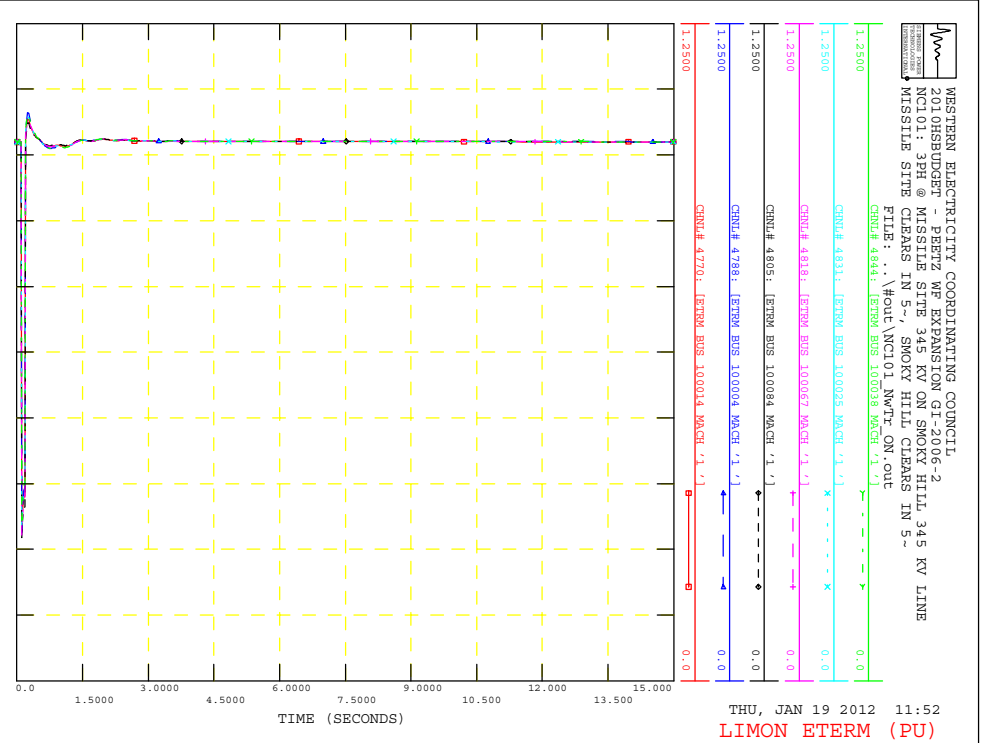
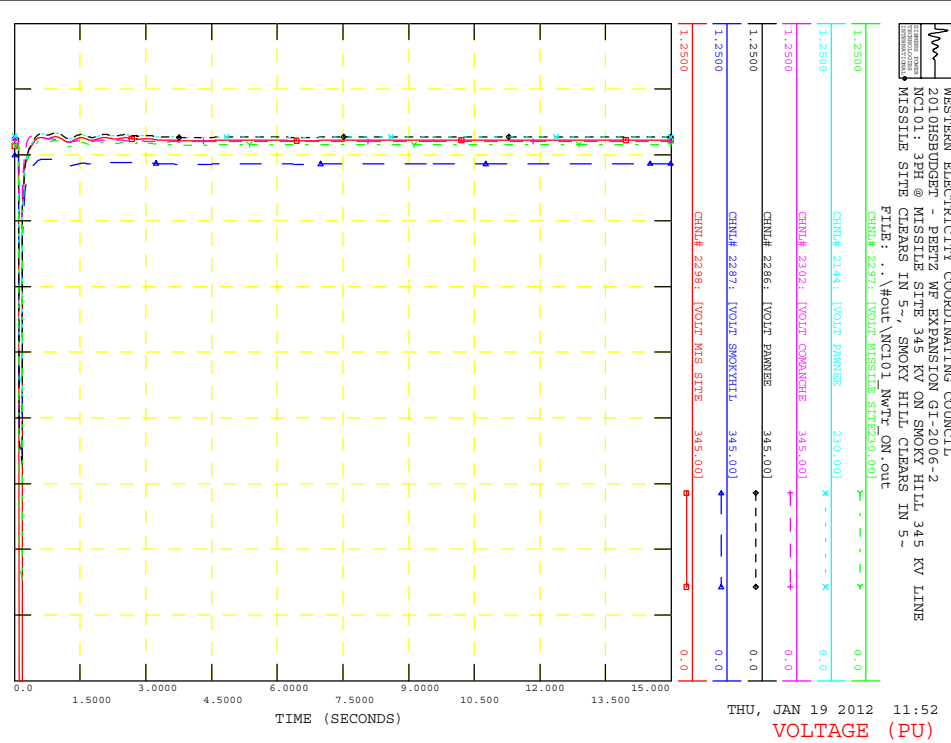


THU, JAN 19 2012 11:52
 PWNEE & MNCHF, ANGLE (DEG)

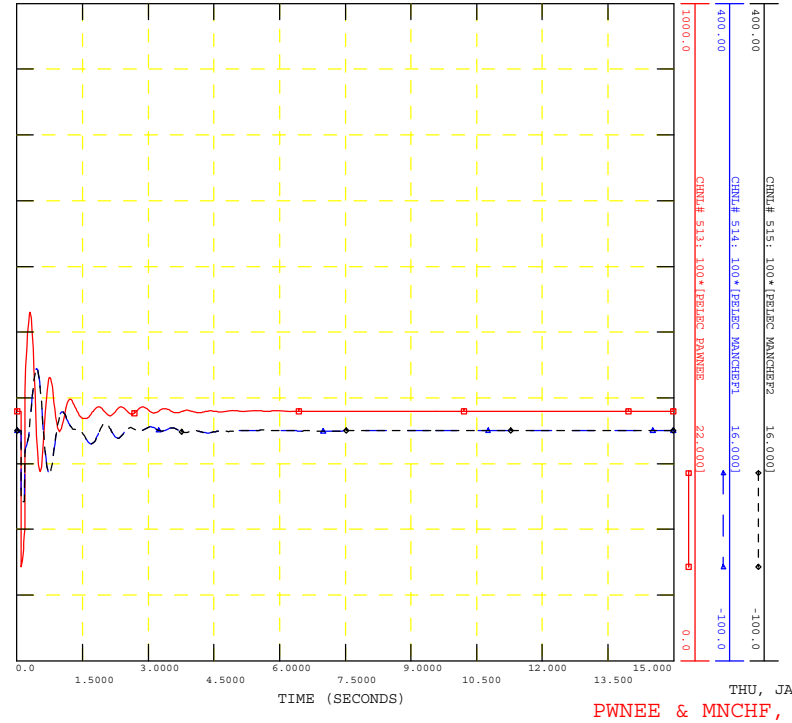
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI00: 3PH @ MISSILE SITE 345 KV ON PANNER 345 KV LINE
 MISSILE SITE CLEARS IN 5-, PANNER CLEARS IN 5-
 FILE: ..\Hour\NCI00_mwTr_0N.out



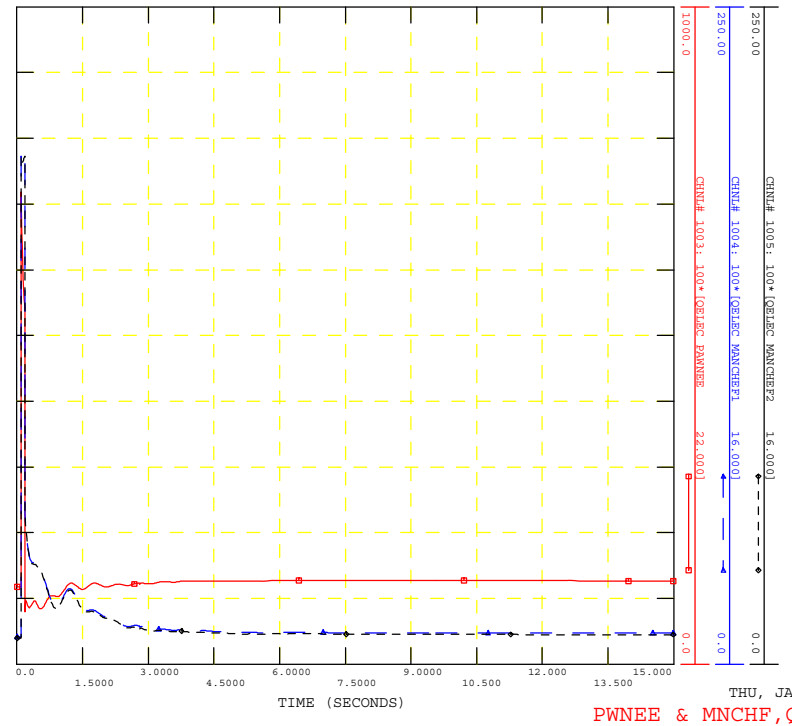
THU, JAN 19 2012 11:52
 PWNEE & MNCHF, SPDDEV (PU)



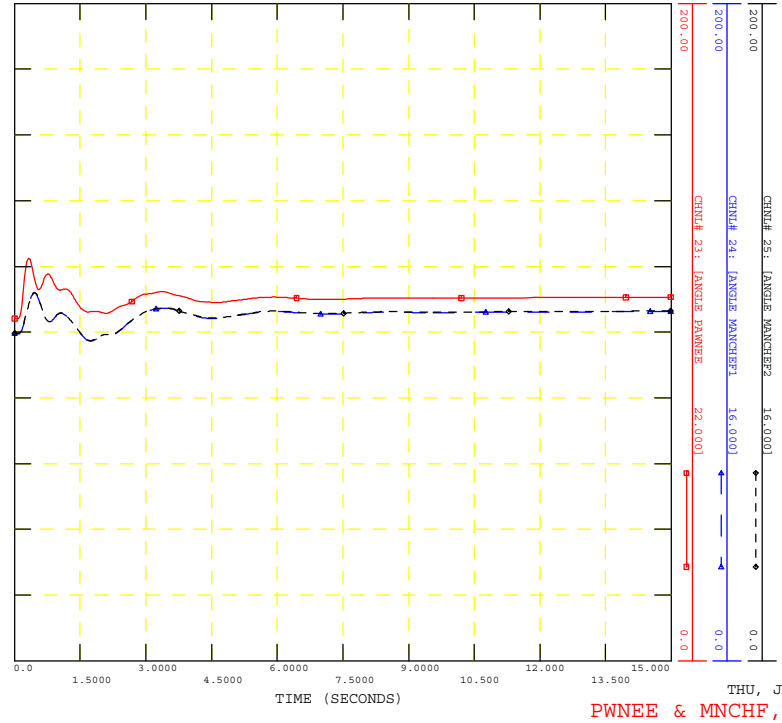
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_mwTr_0N.out



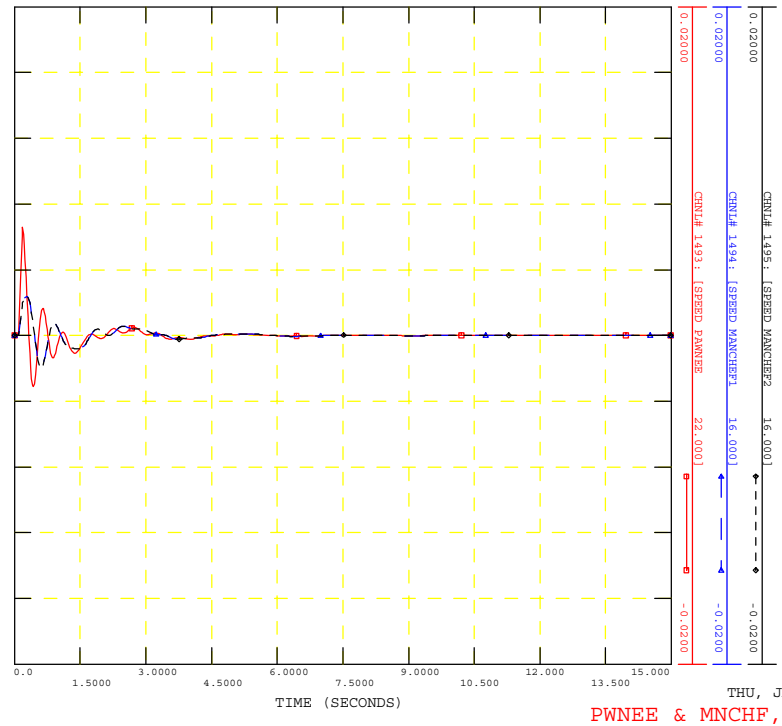
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_mvTr_0N.out

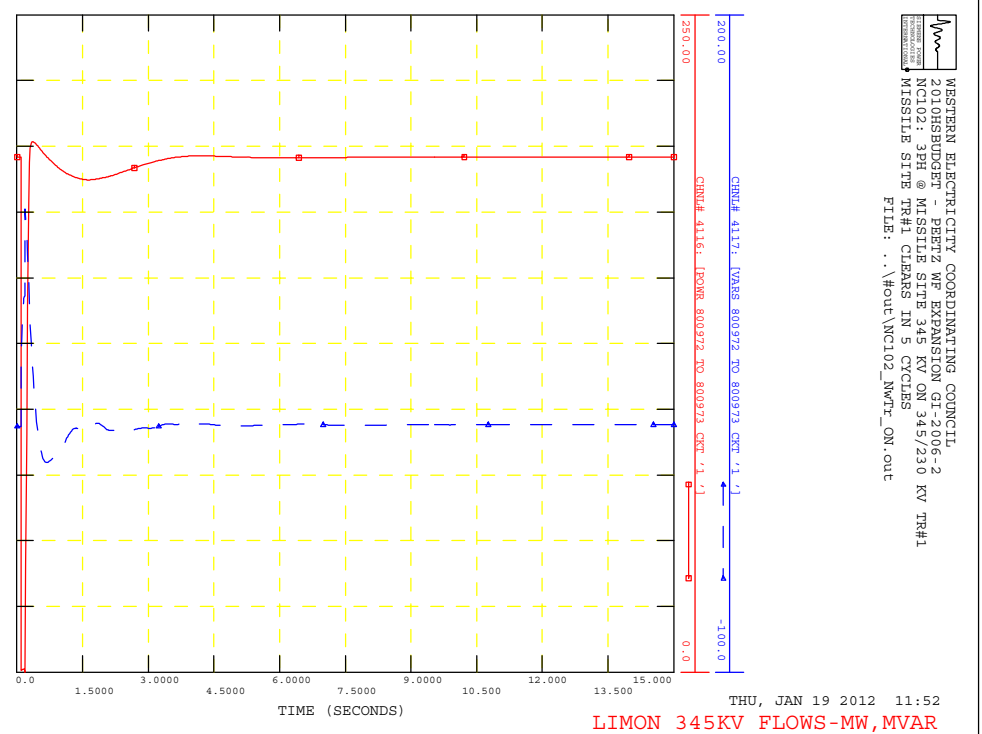
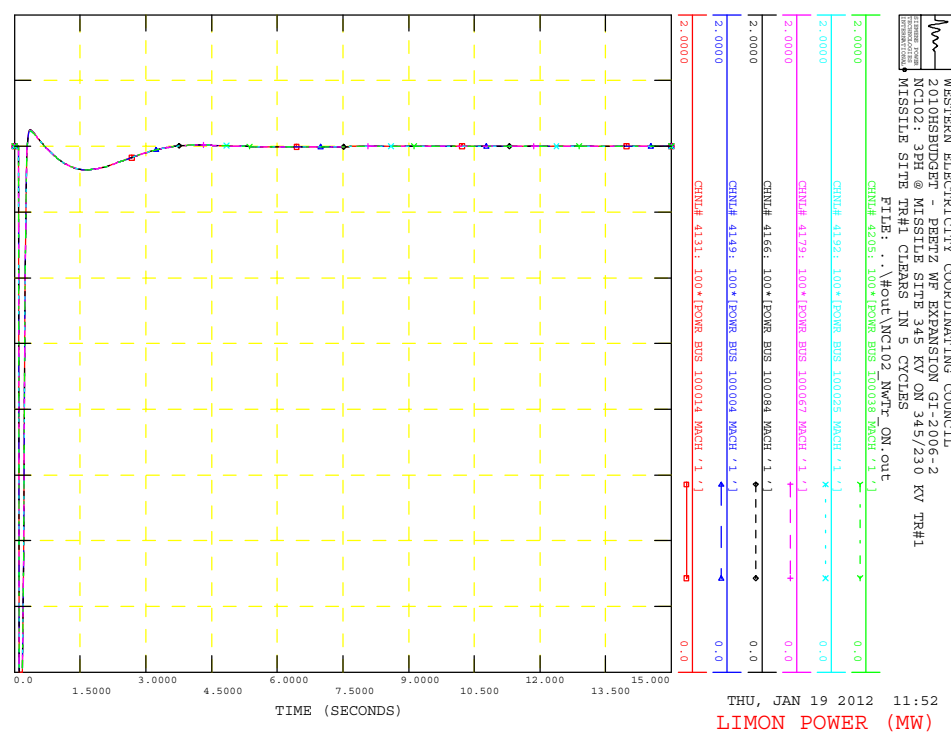
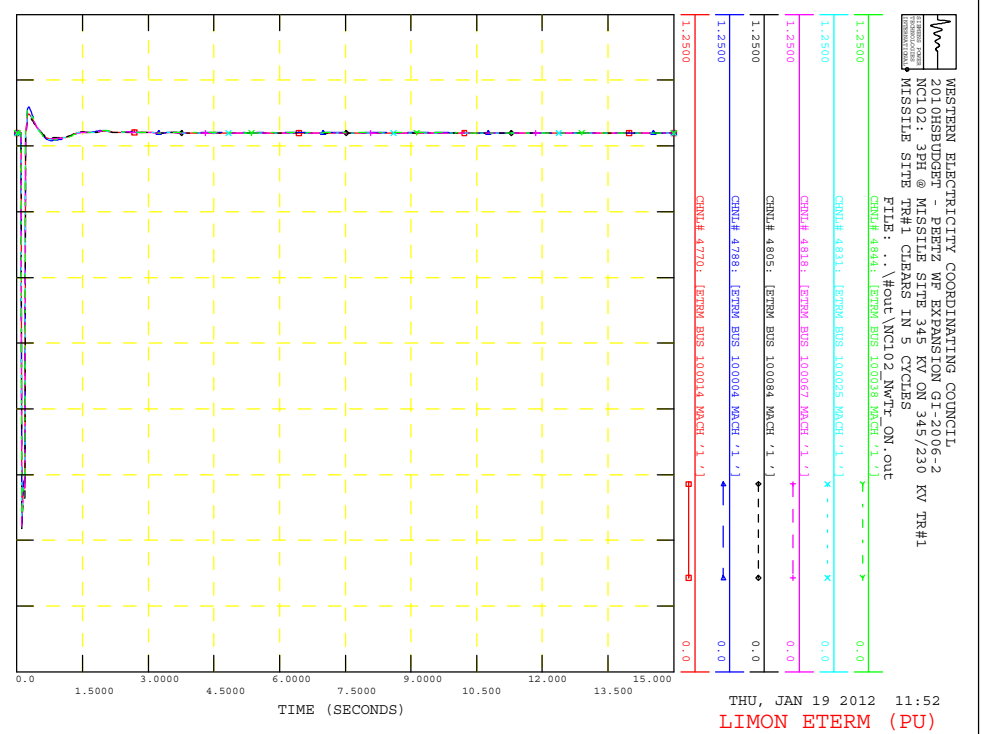
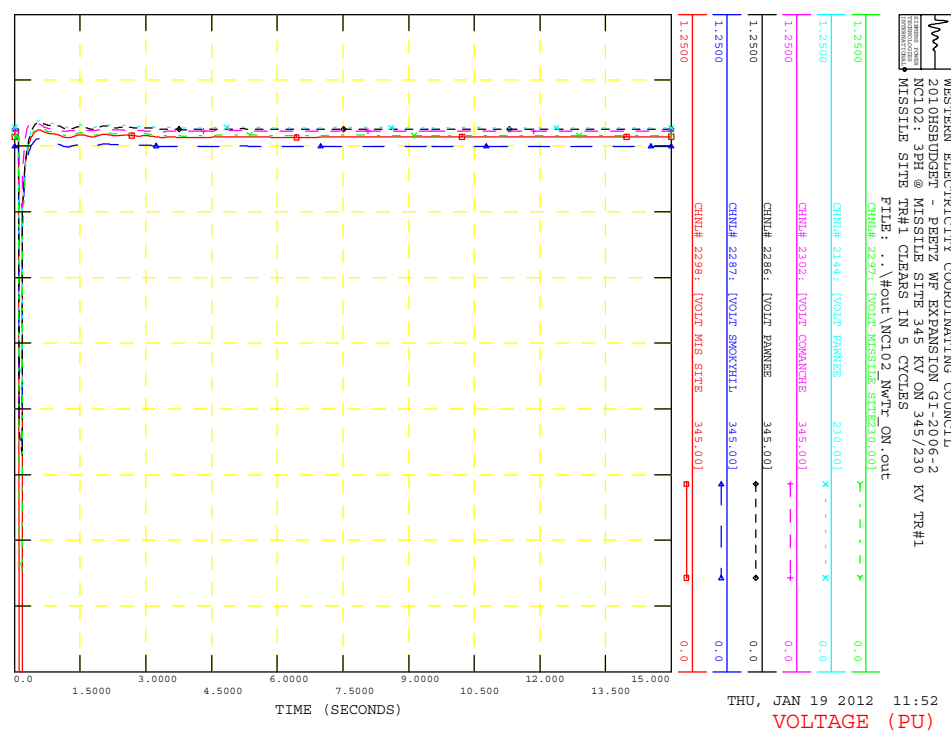


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_mwTr_0N.out

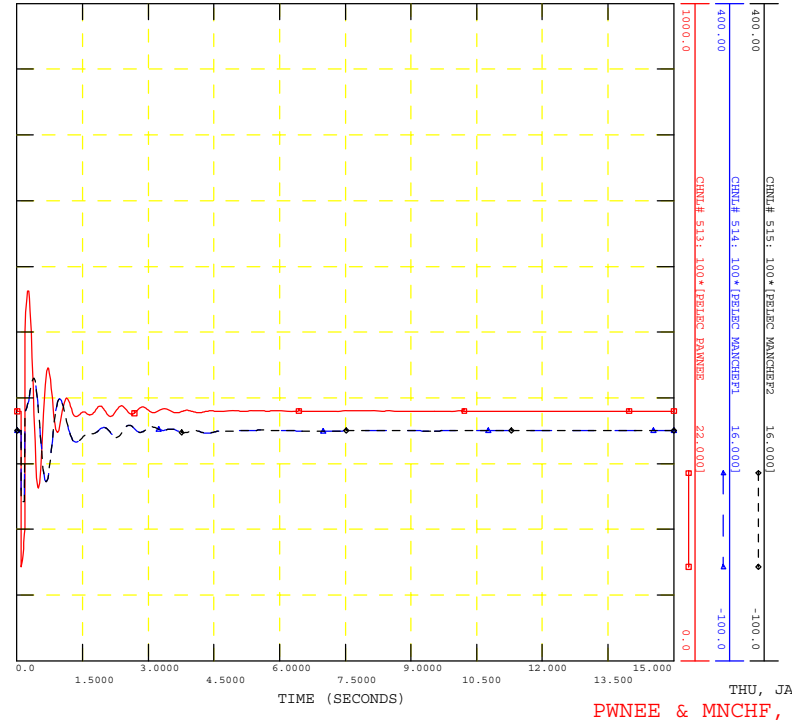


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI01: 3PH @ MISSILE SITE 345 KV ON SMOXY HILL 345 KV LINE
 MISSILE SITE CLEARS IN 5-, SMOXY HILL CLEARS IN 5-
 FILE: ..\Hour\NCI01_mvTr_0N.out

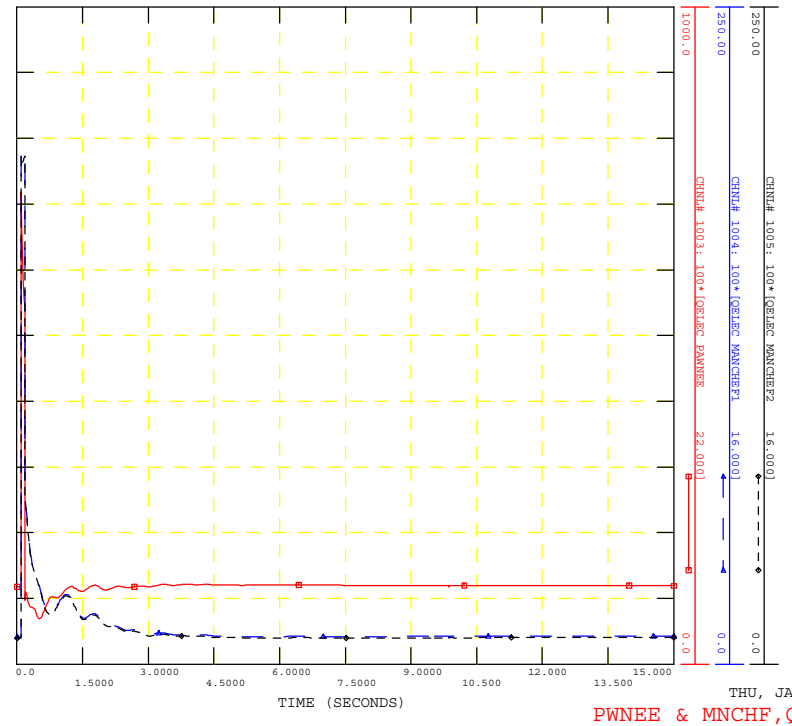




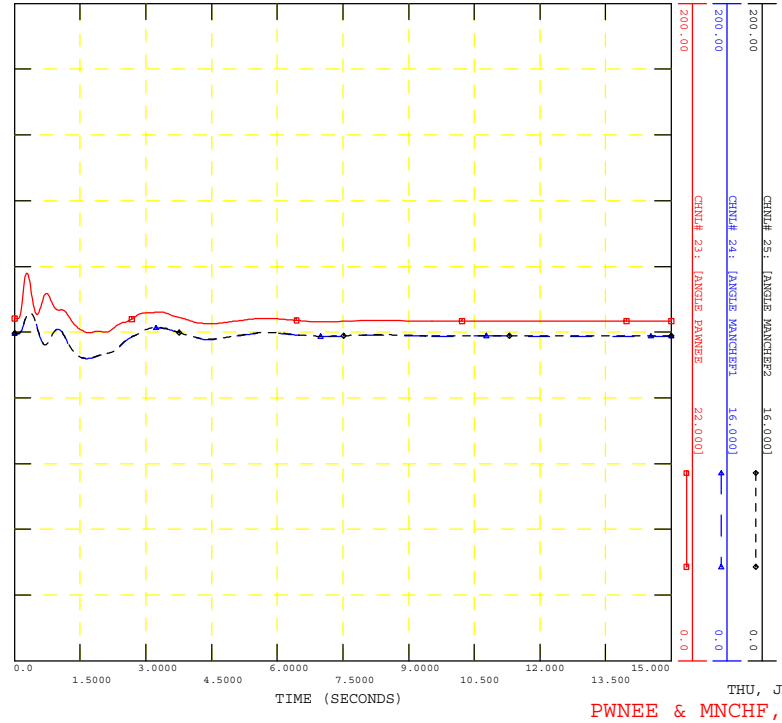
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_mwTr_0N.out



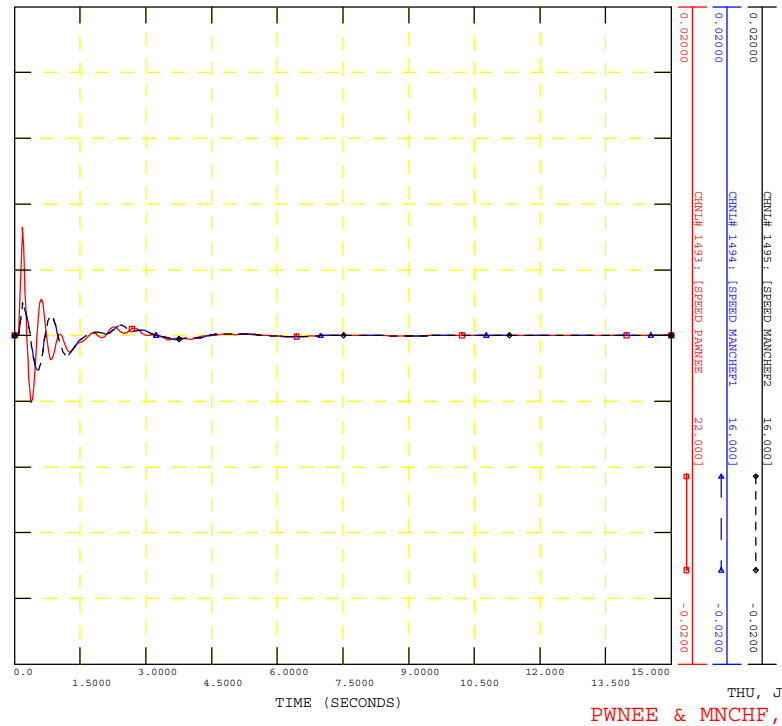
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_mvTr_0N.out

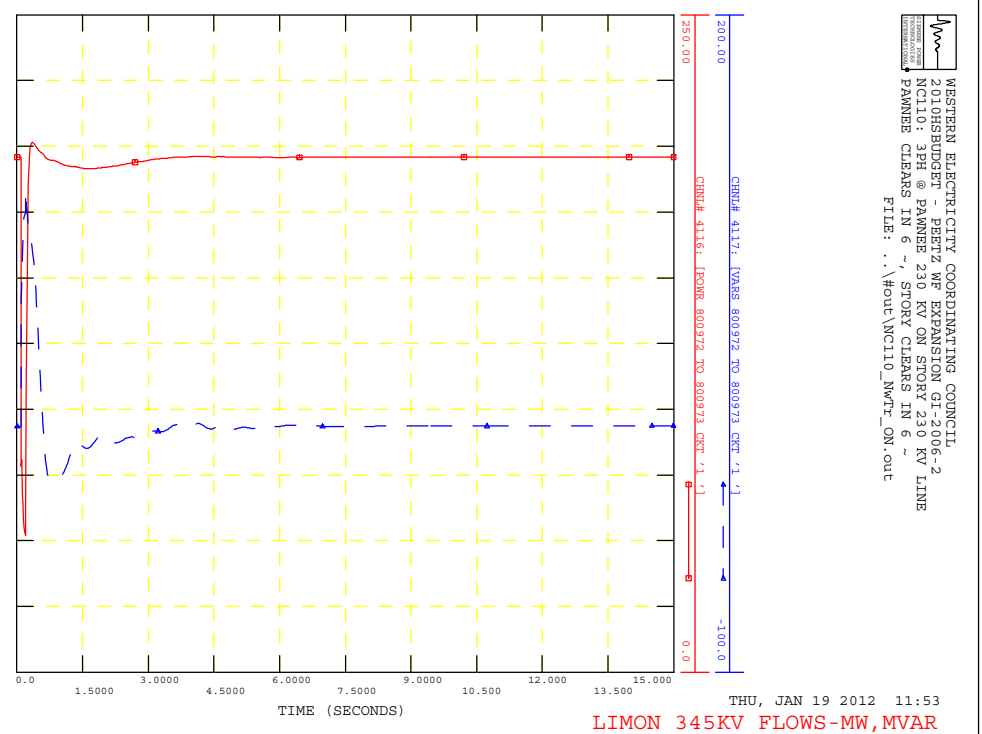
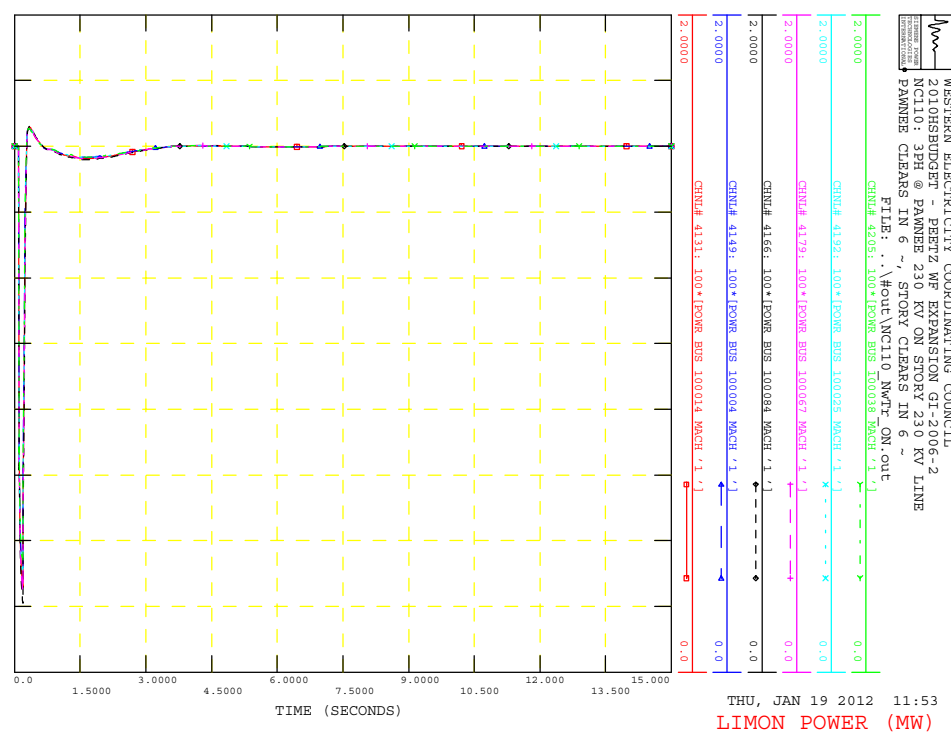
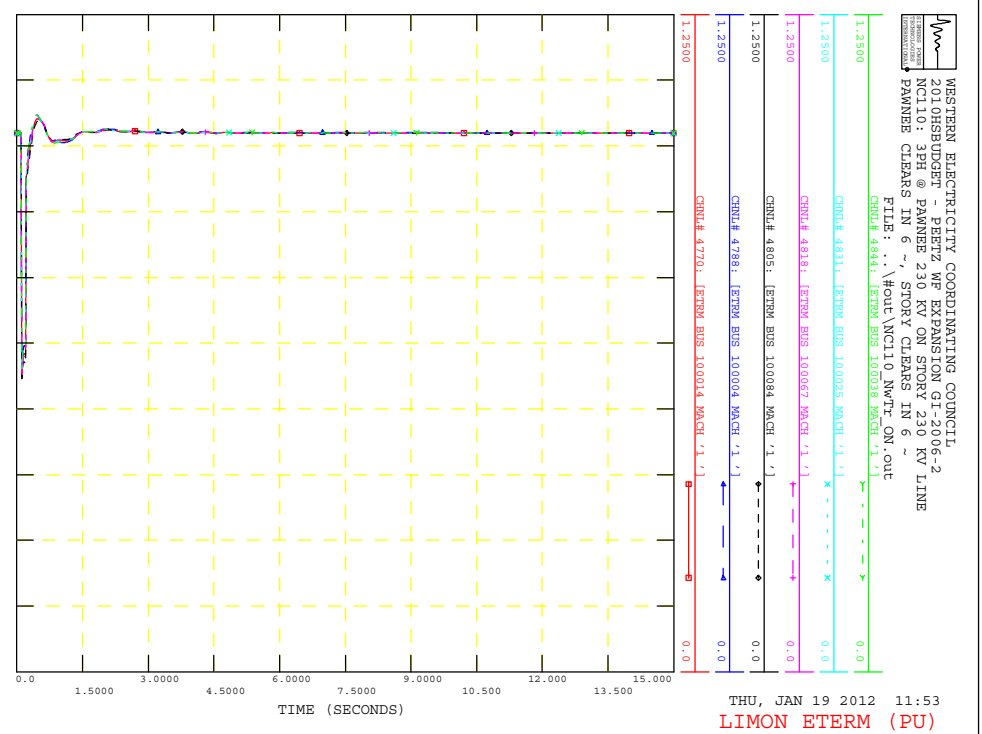
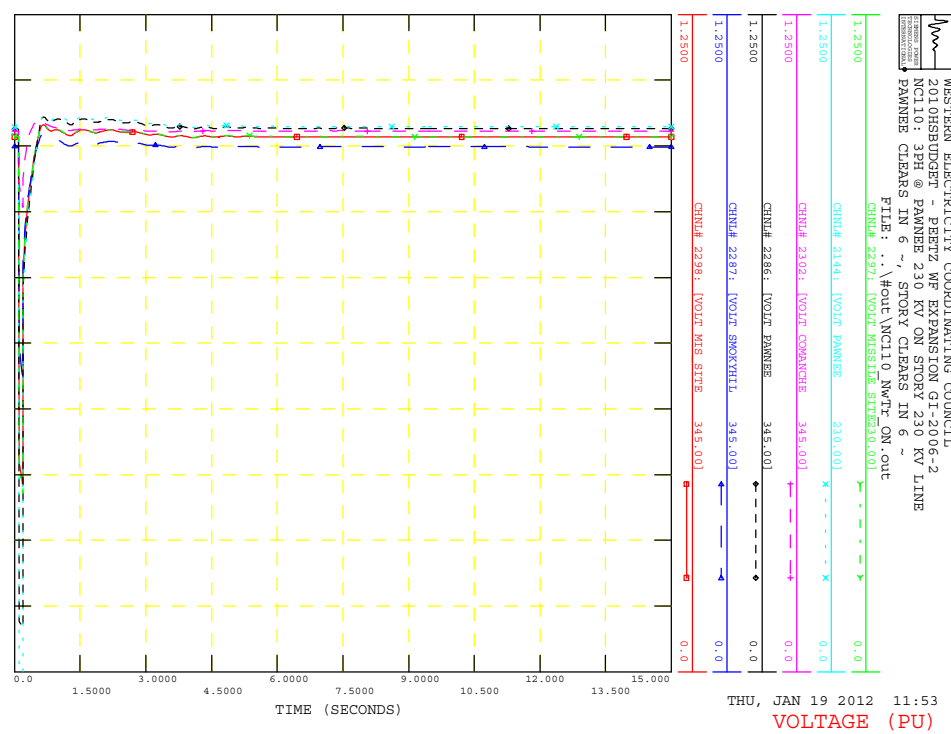


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_mvTr_0N.out

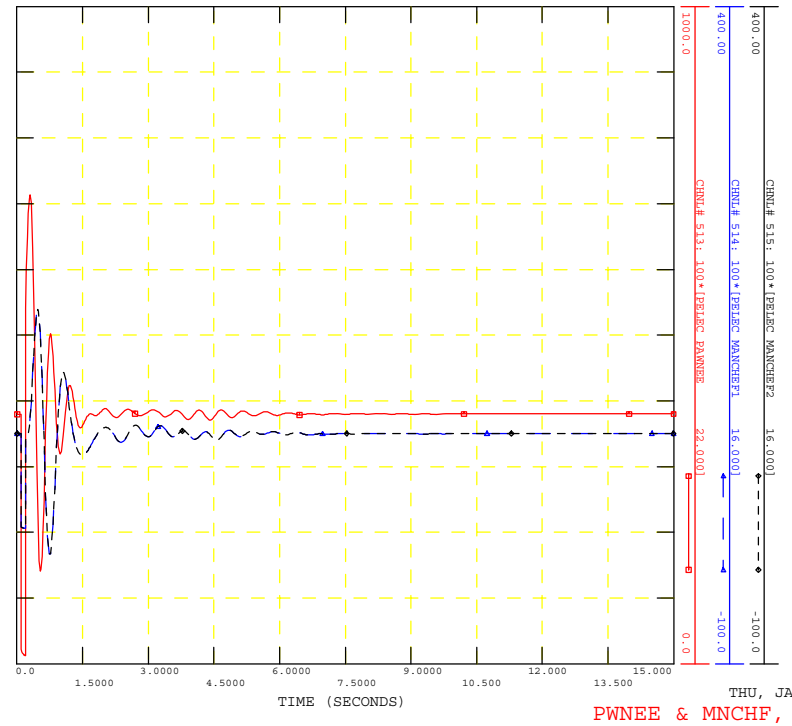


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI02: 3PH @ MISSILE SITE 345 KV ON 345/230 KV TR#1
 MISSILE SITE TR#1 CLEARS IN 5 CYCLES
 FILE: ..\Hour\NCI02_mvTr_0N.out

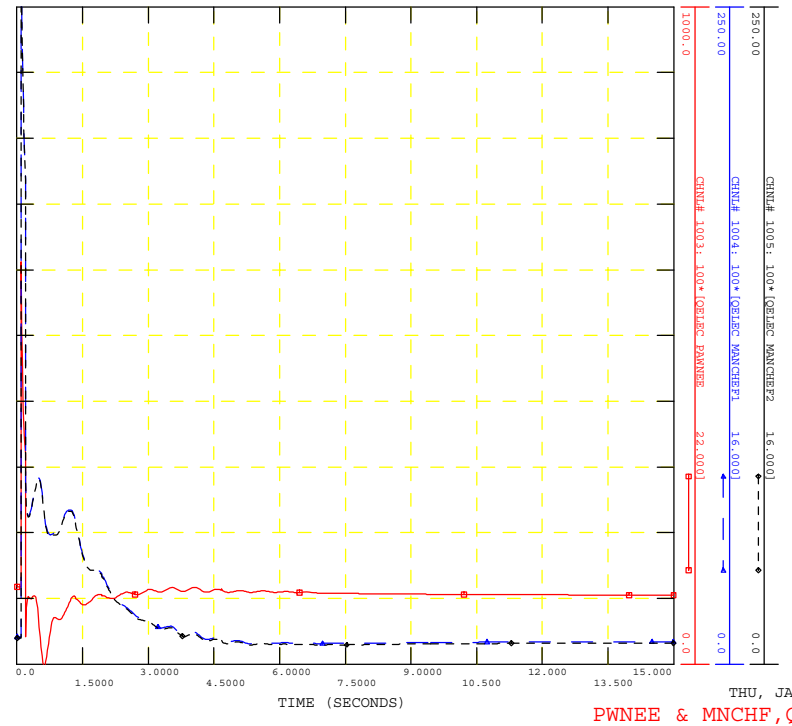




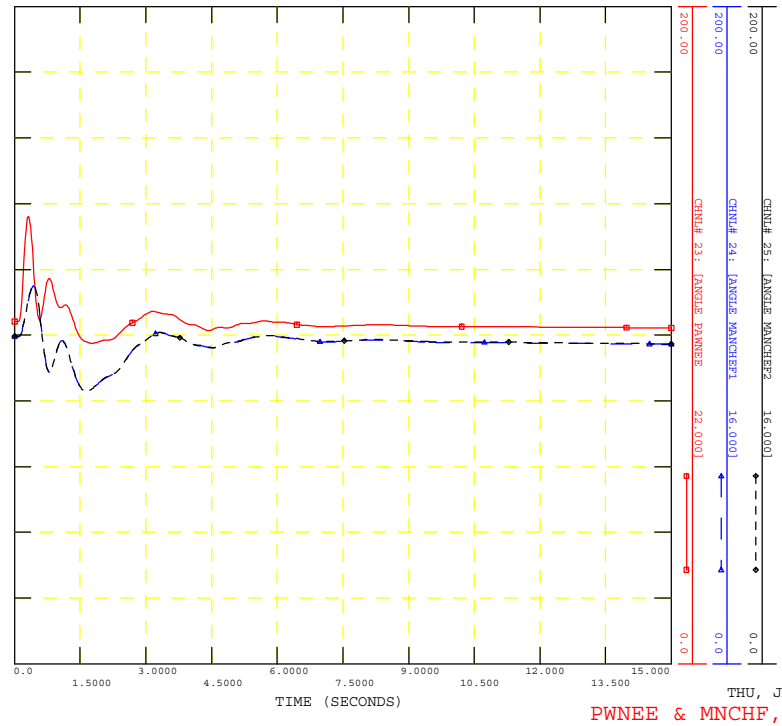
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERIZ WF EXPANSION GI-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_mwTr_0M.out



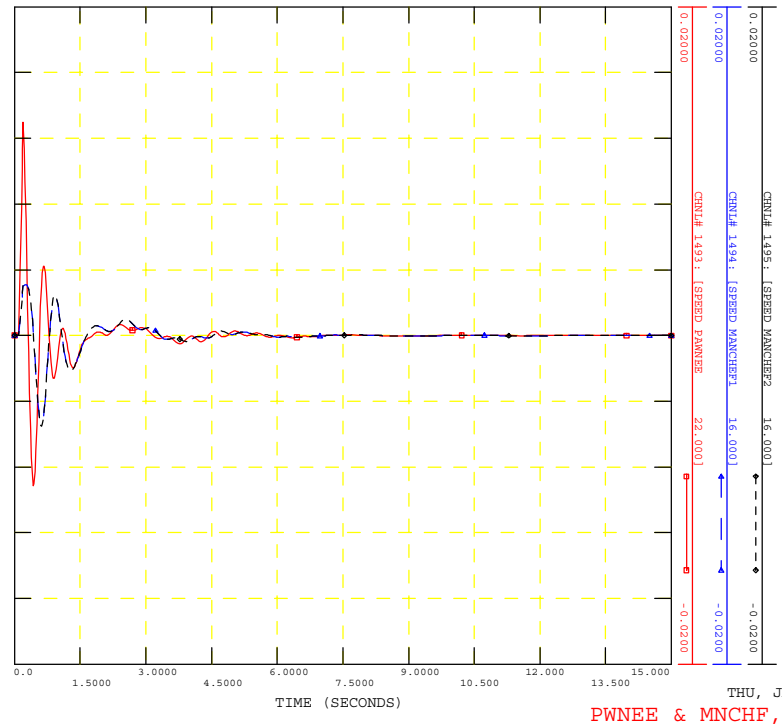
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERIZ WF EXPANSION GI-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_mwTr_0M.out

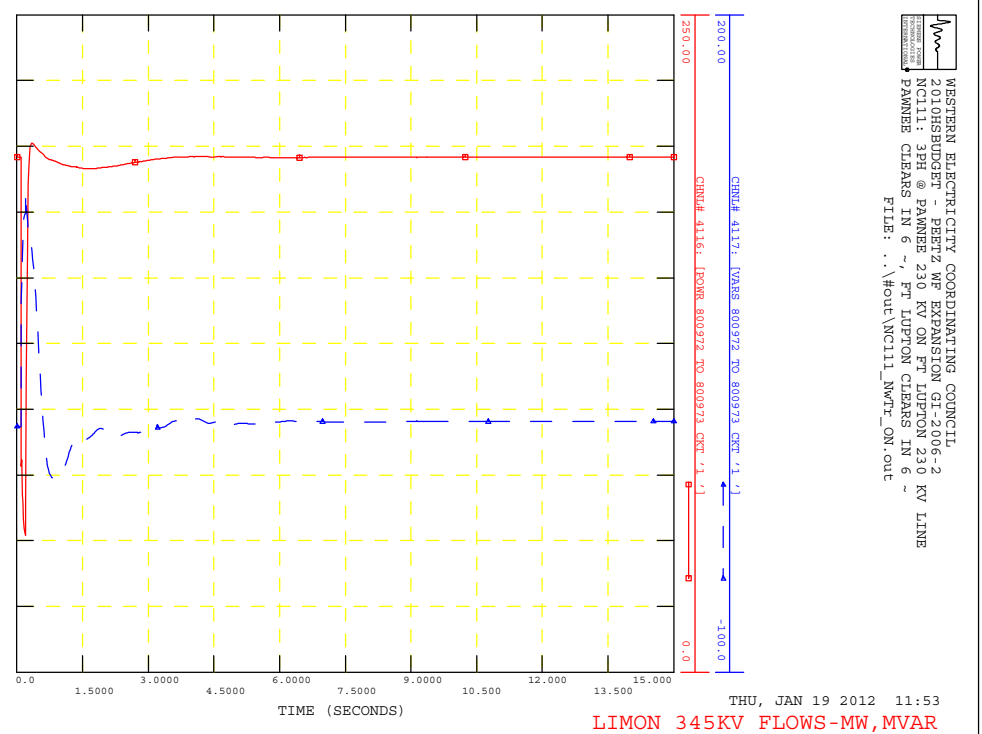
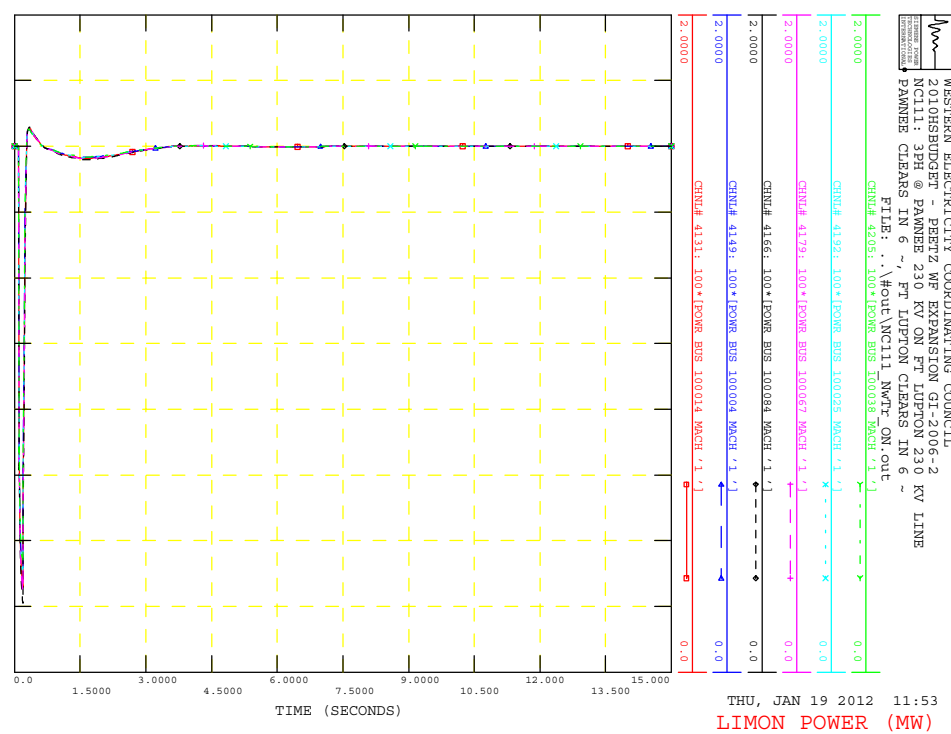
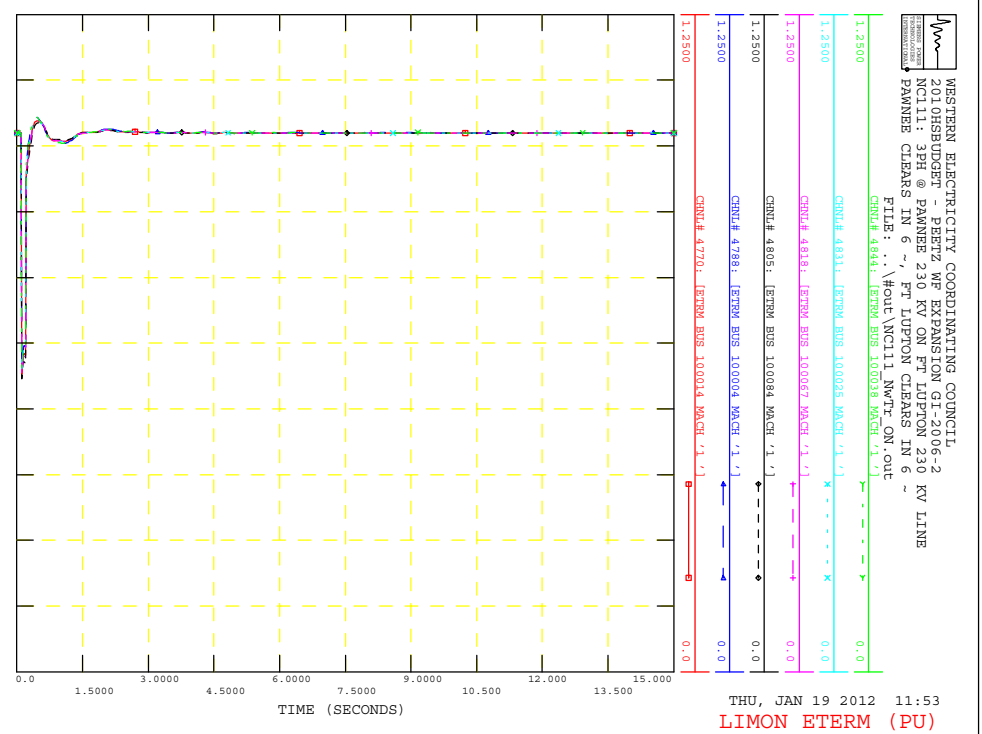
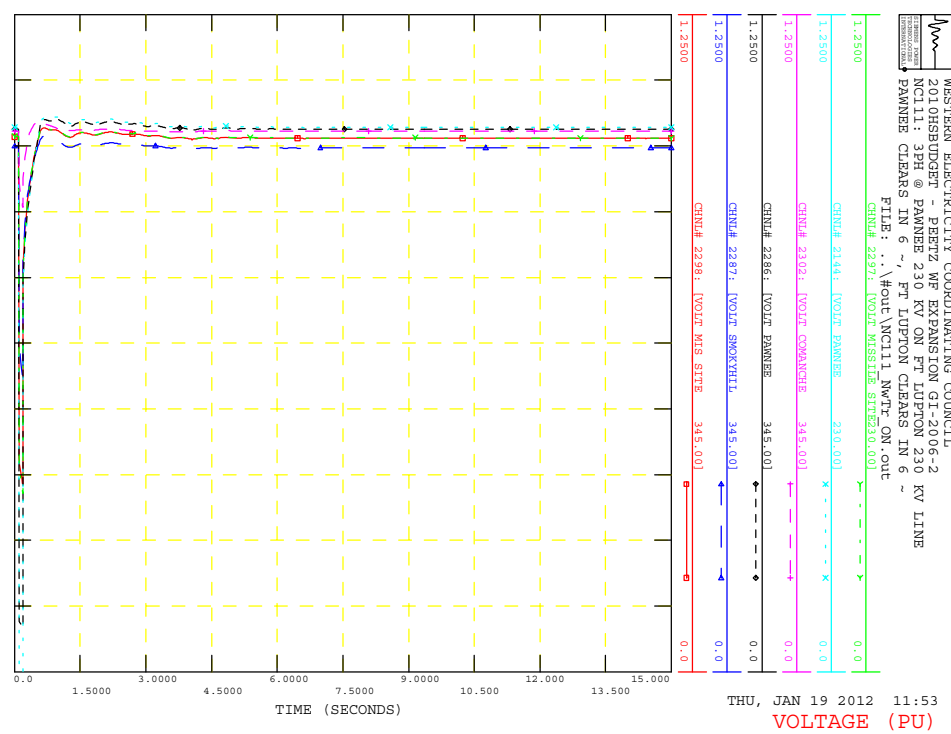


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERIZ WF EXPANSION GI-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_mwTr_0M.out

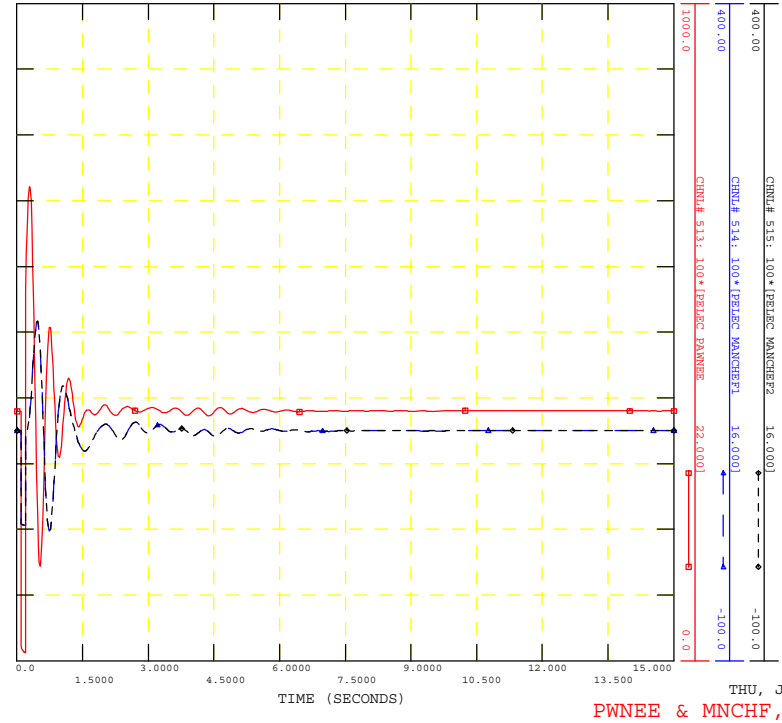


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERIZ WF EXPANSION GI-2006-2
 NCL10: 3PH @ PANNER 230 KV ON STORY 230 KV LINE
 PANNER CLEARS IN 6 ~, STORY CLEARS IN 6 ~
 FILE: ..\Hour\NCL10_mwTr_0M.out

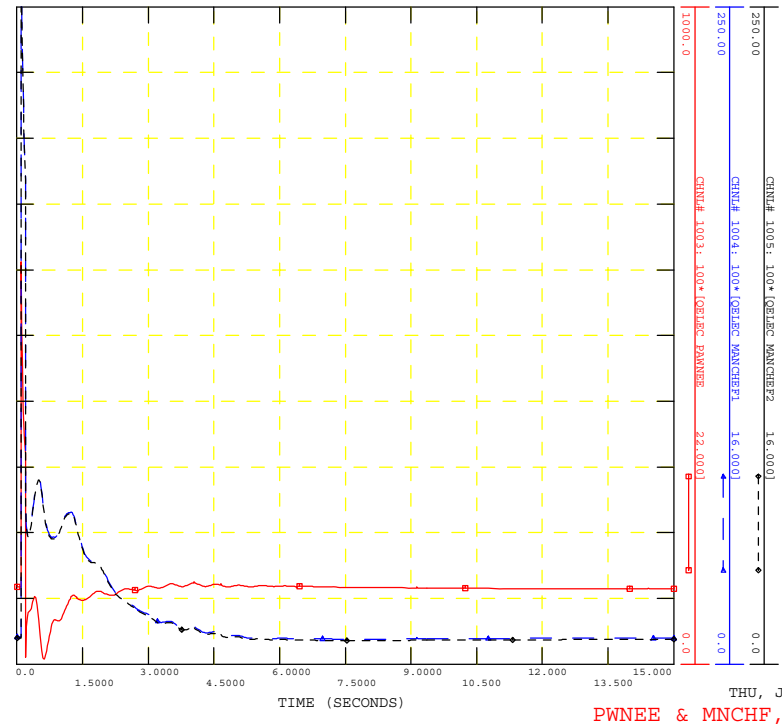




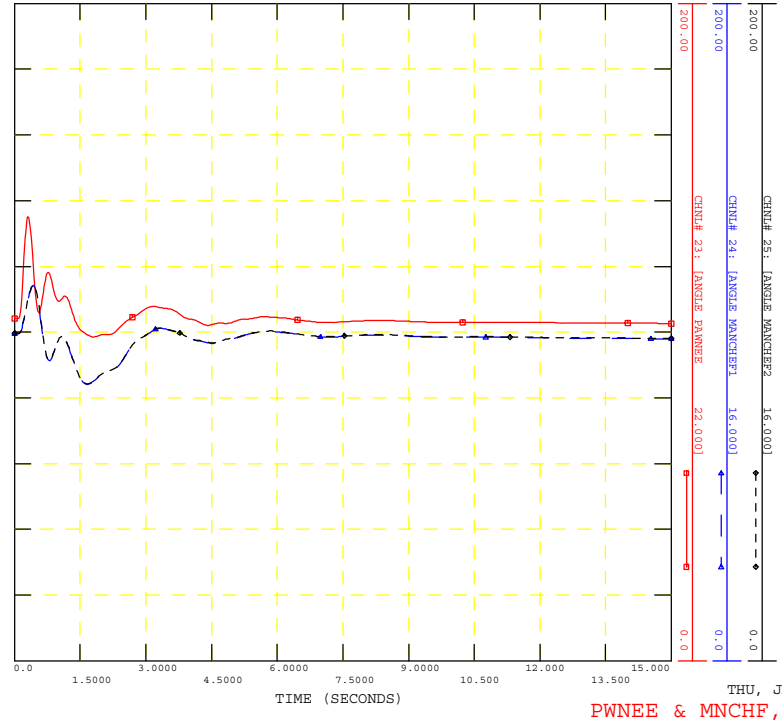
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANWER 230 KV ON FT LUTPON 230 KV LINE
 PANWER CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\Hour\NC11_mwTr_0N.out



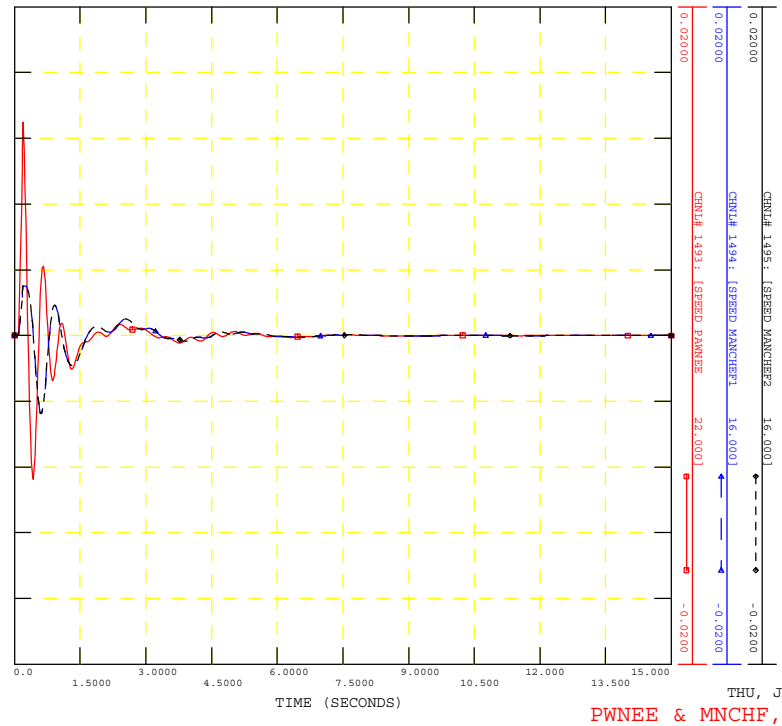
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANWER 230 KV ON FT LUTPON 230 KV LINE
 PANWER CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\Hour\NC11_mwTr_0N.out

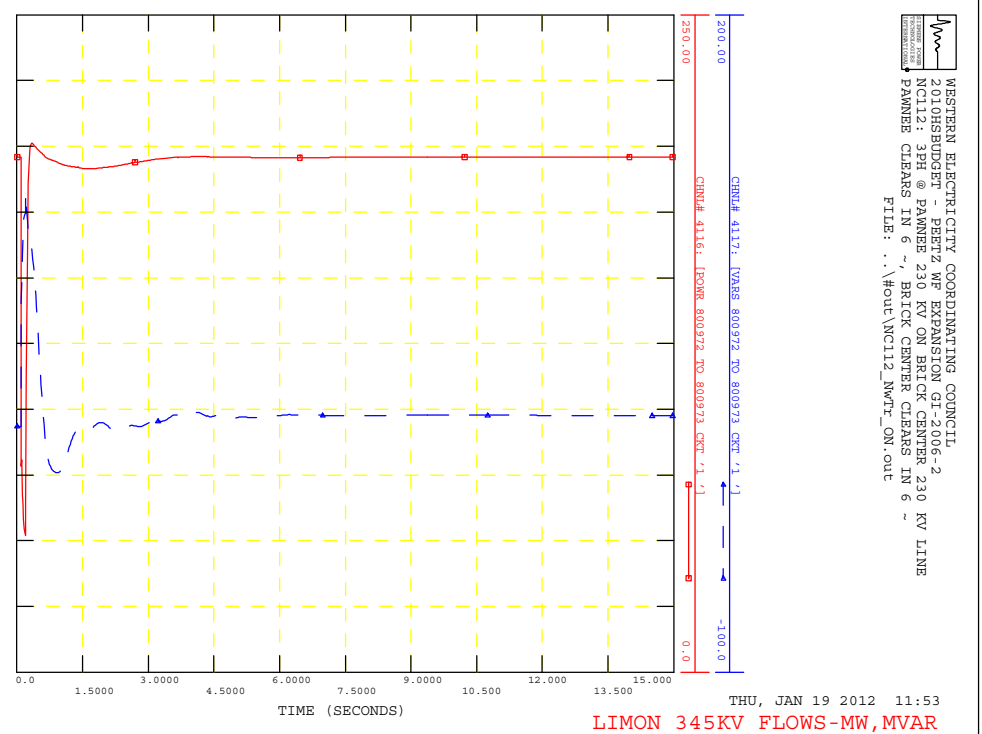
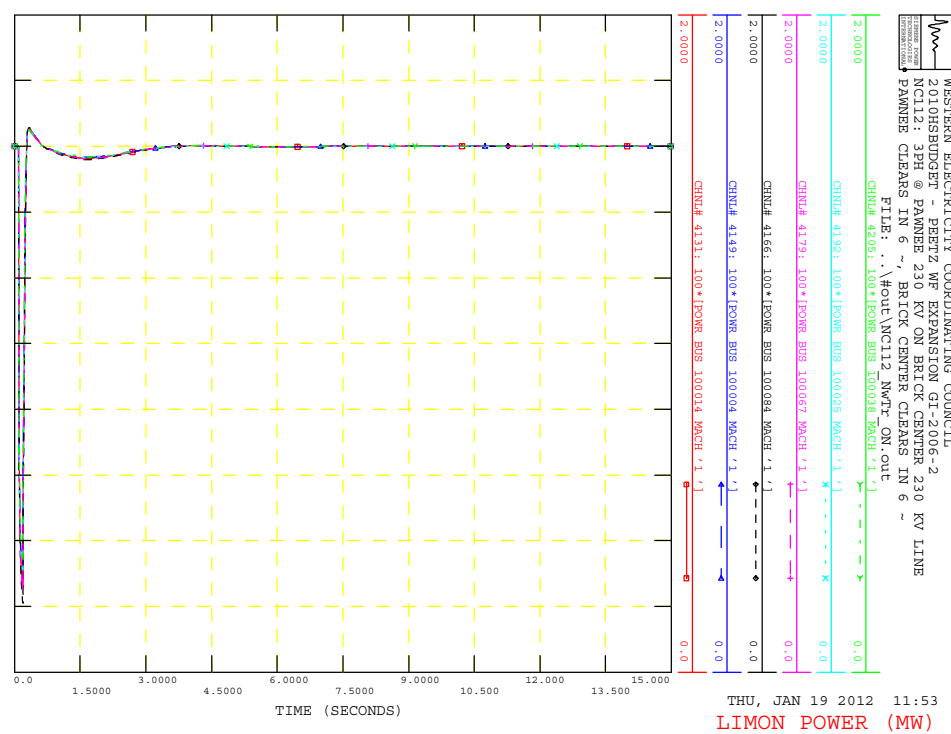
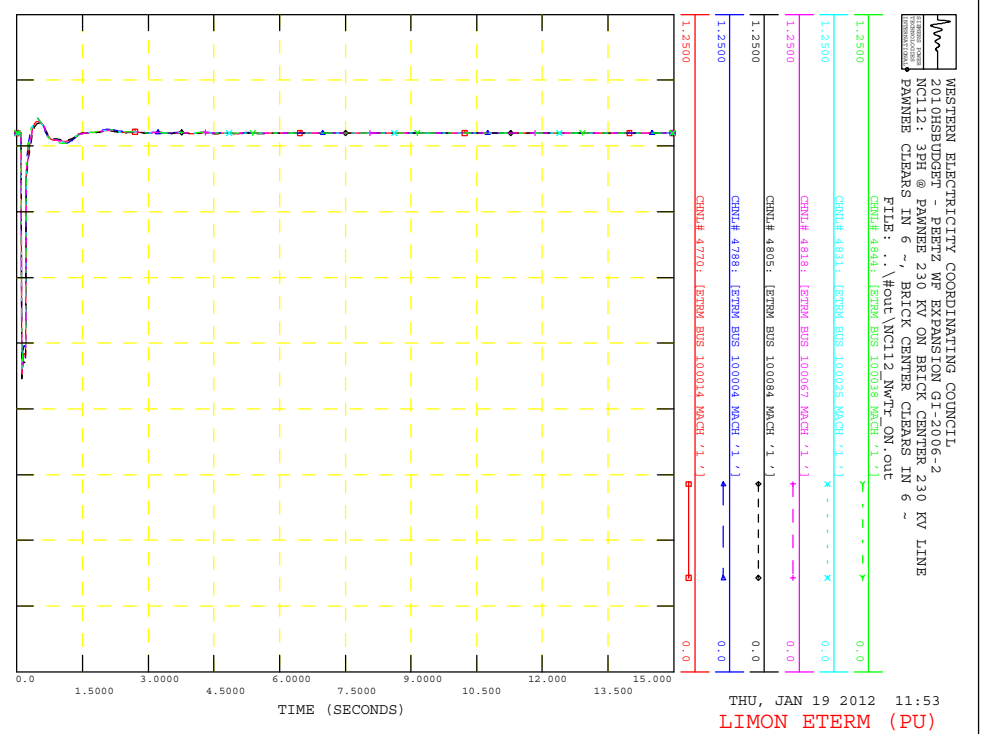
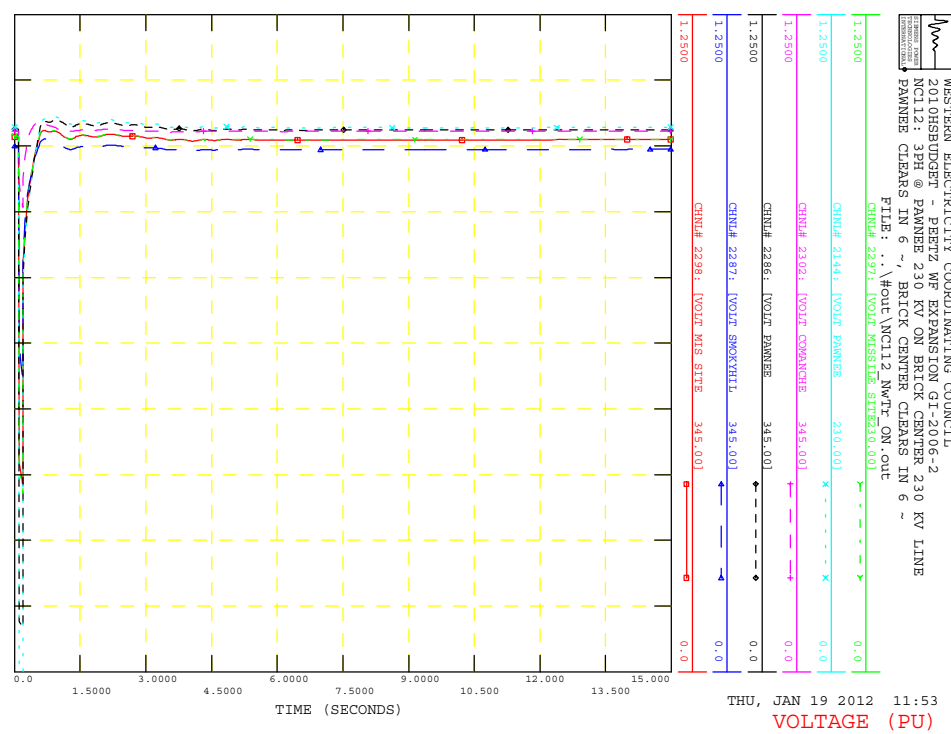


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANWER 230 KV ON FT LUTPON 230 KV LINE
 PANWER CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\Hour\NC11_mwTr_0N.out

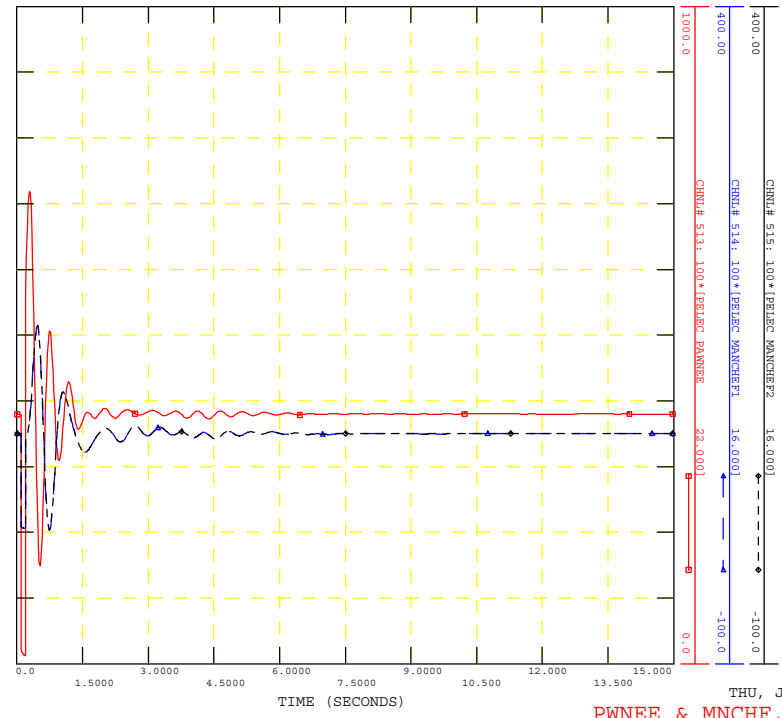


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PELETZ WF EXPANSION GI-2006-2
 NC11: 3PH @ PANWER 230 KV ON FT LUTPON 230 KV LINE
 PANWER CLEARS IN 6 ~, FT LUTPON CLEARS IN 6 ~
 FILE: ..\Hour\NC11_mwTr_0N.out

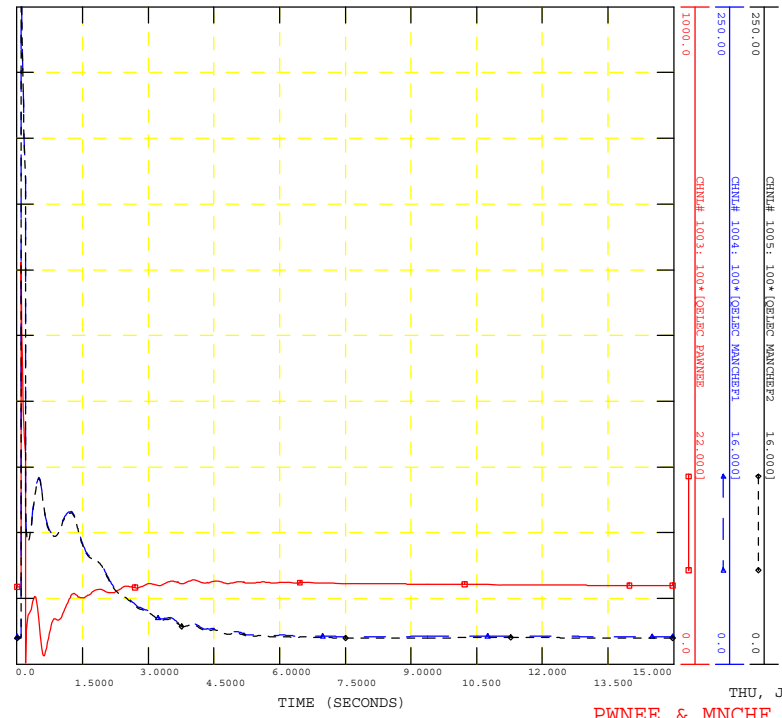




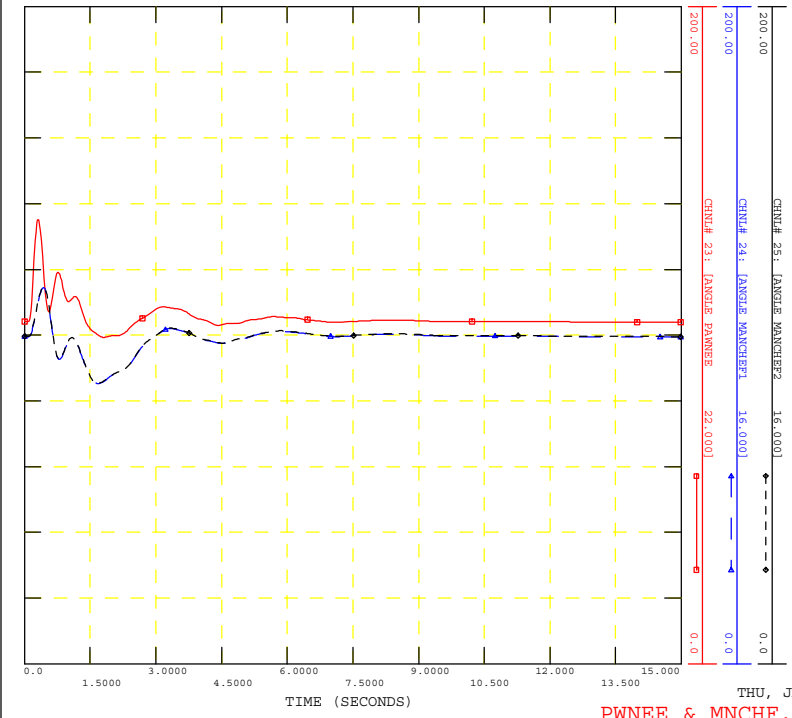
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNEE 230 KV ON BRICK CENTER 230 KV LINE
 PANNEE CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\Hour\NCI12_mwTr_0N.out



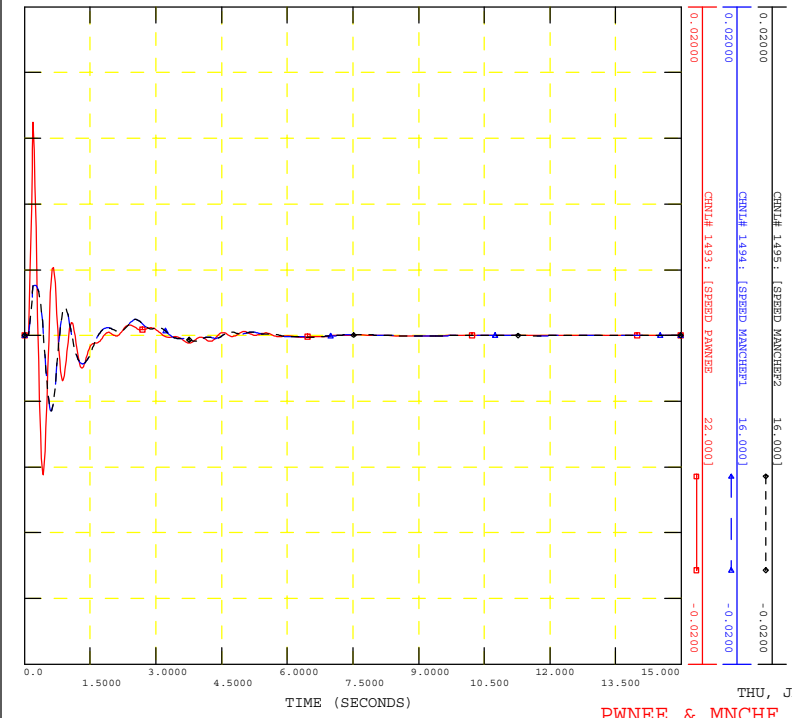
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNEE 230 KV ON BRICK CENTER 230 KV LINE
 PANNEE CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\Hour\NCI12_mwTr_0N.out

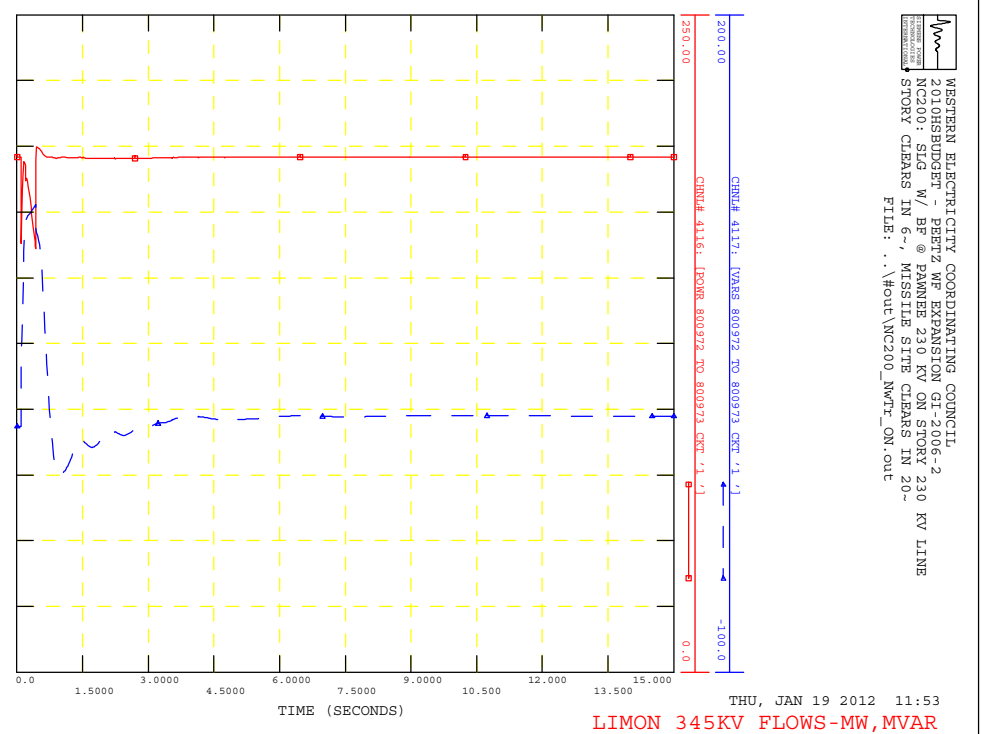
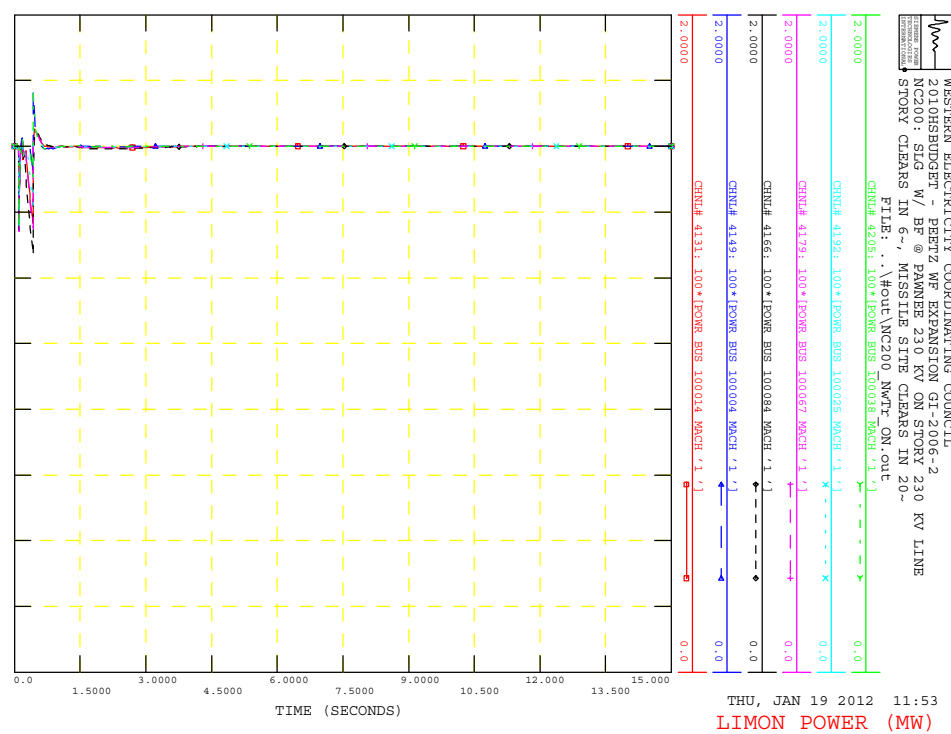
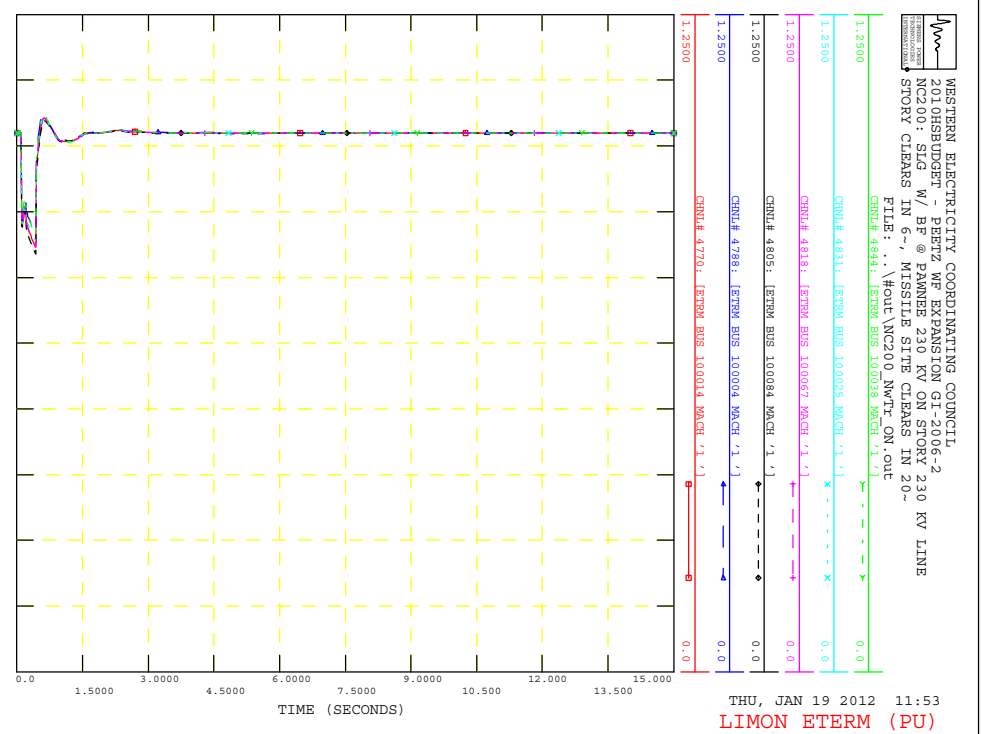
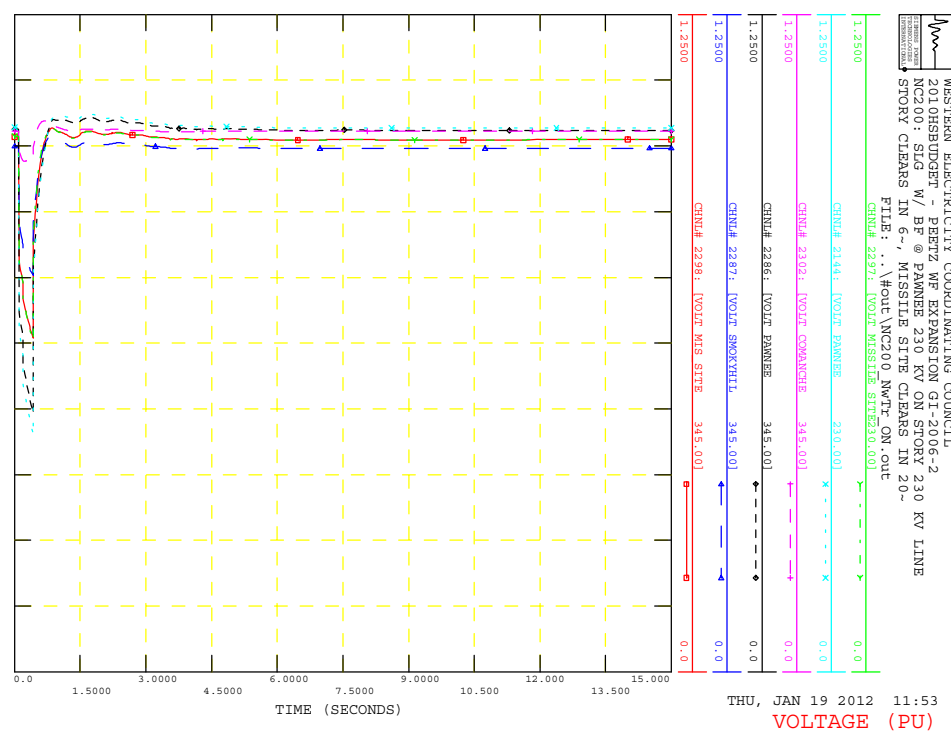


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNEE 230 KV ON BRICK CENTER 230 KV LINE
 PANNEE CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\Hour\NCI12_mwTr_0N.out

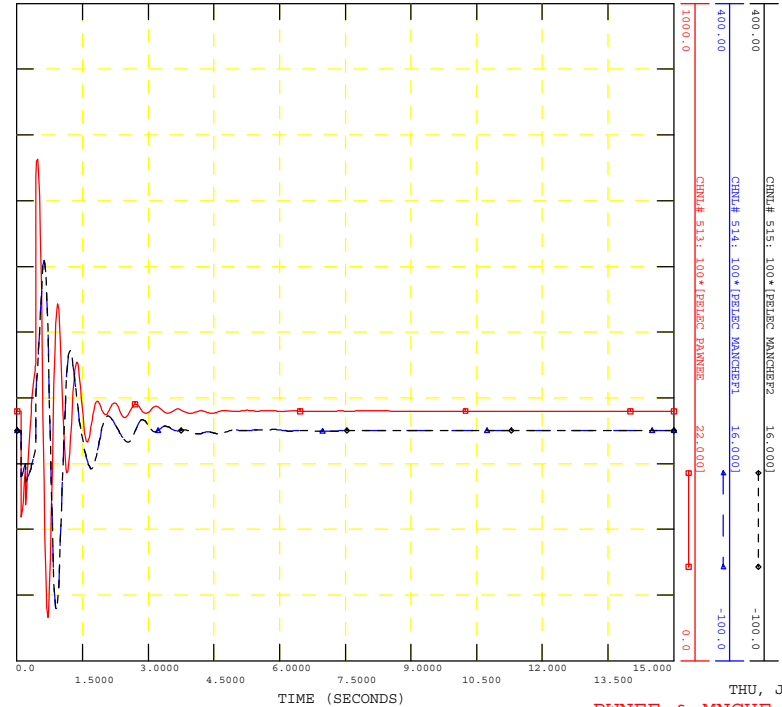


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NCI12: 3PH @ PANNEE 230 KV ON BRICK CENTER 230 KV LINE
 PANNEE CLEARS IN 6 ~, BRICK CENTER CLEARS IN 6 ~
 FILE: ..\Hour\NCI12_mwTr_0N.out

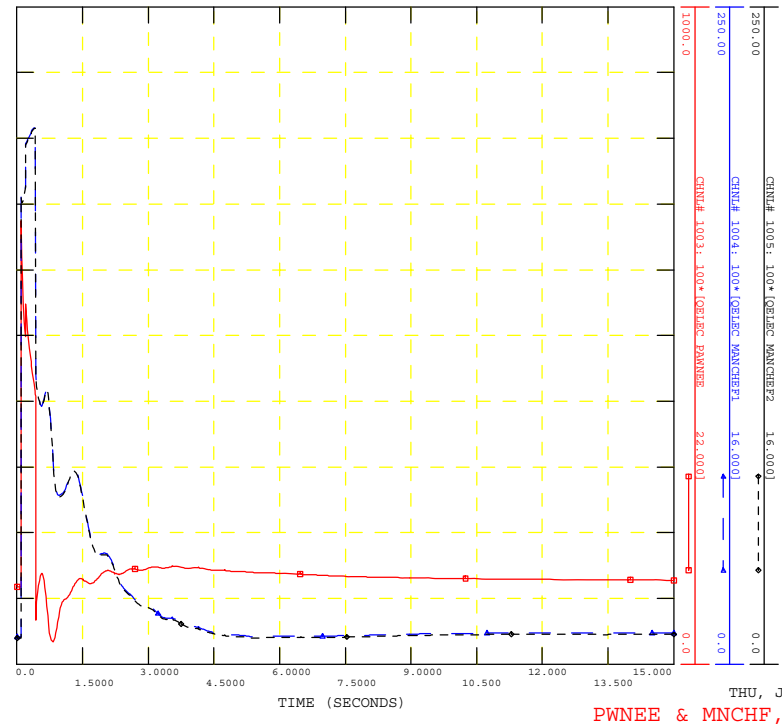




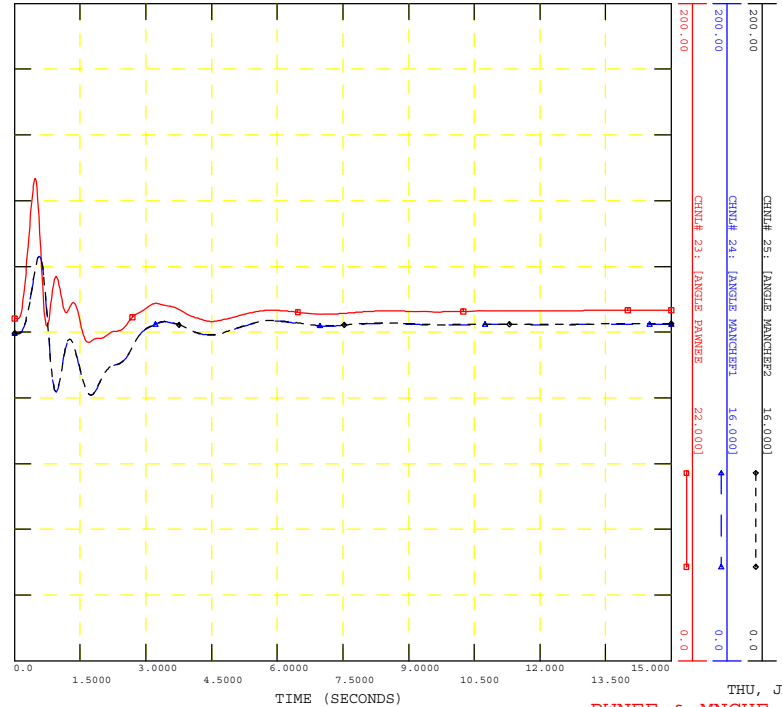
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_mwTr_0N.out



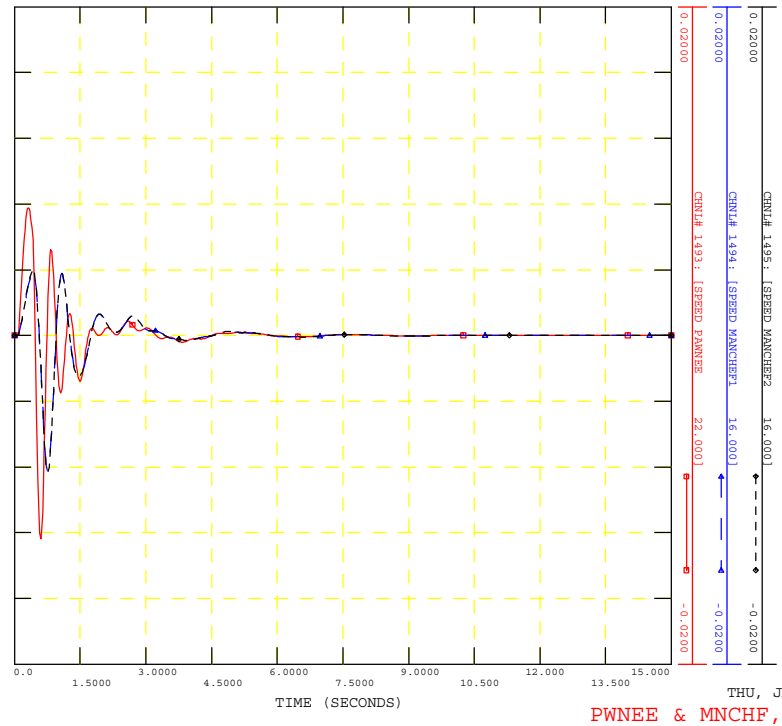
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_mwTr_0N.out

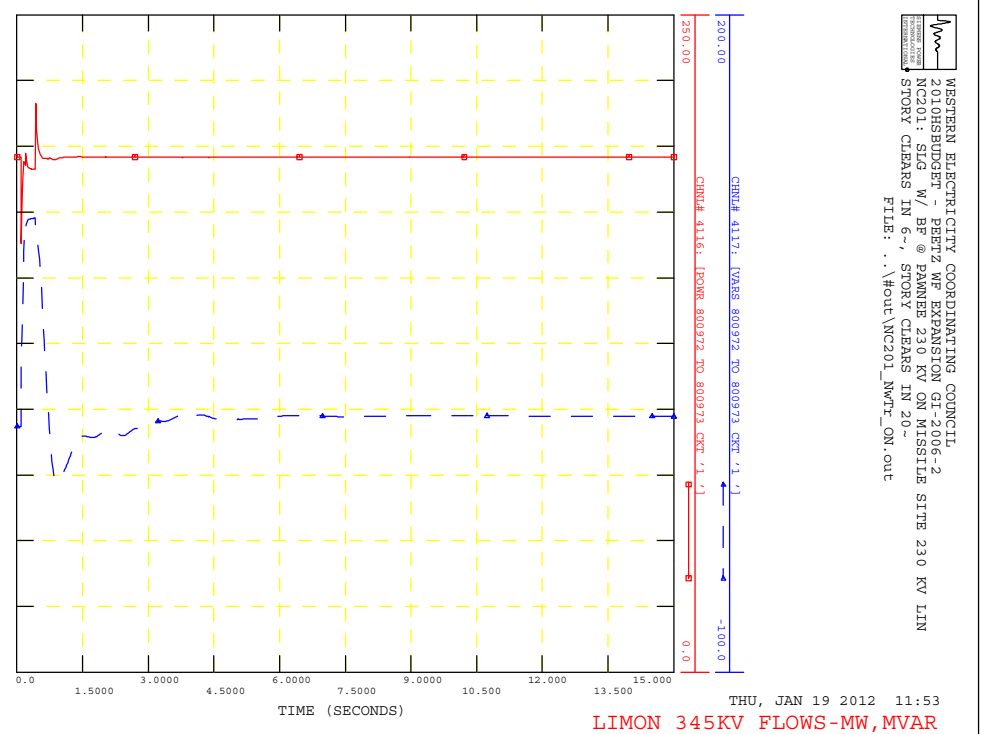
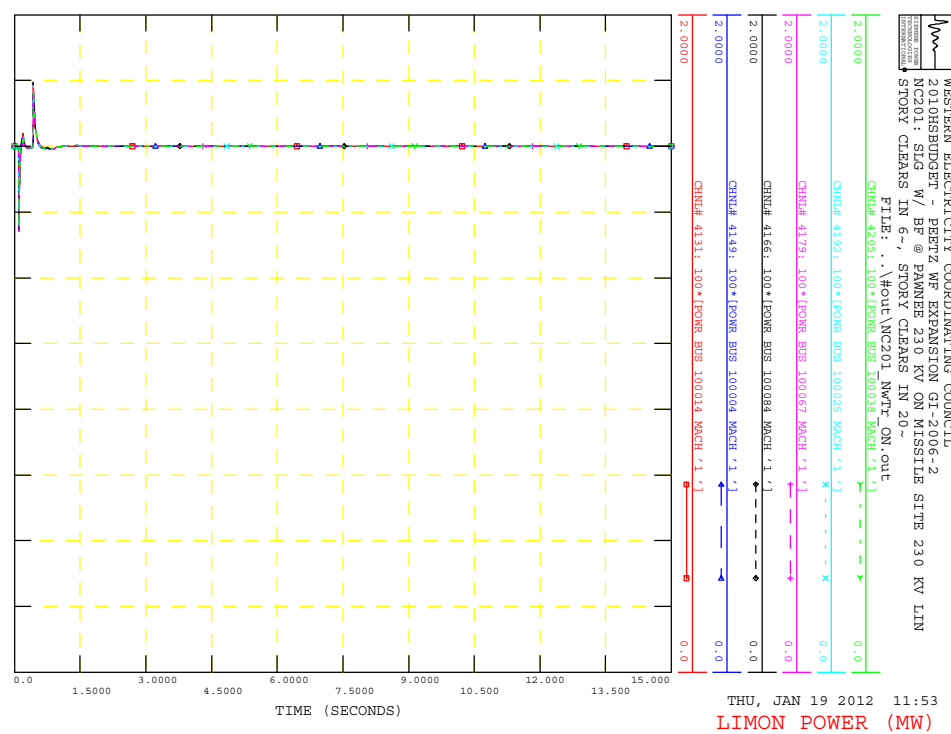
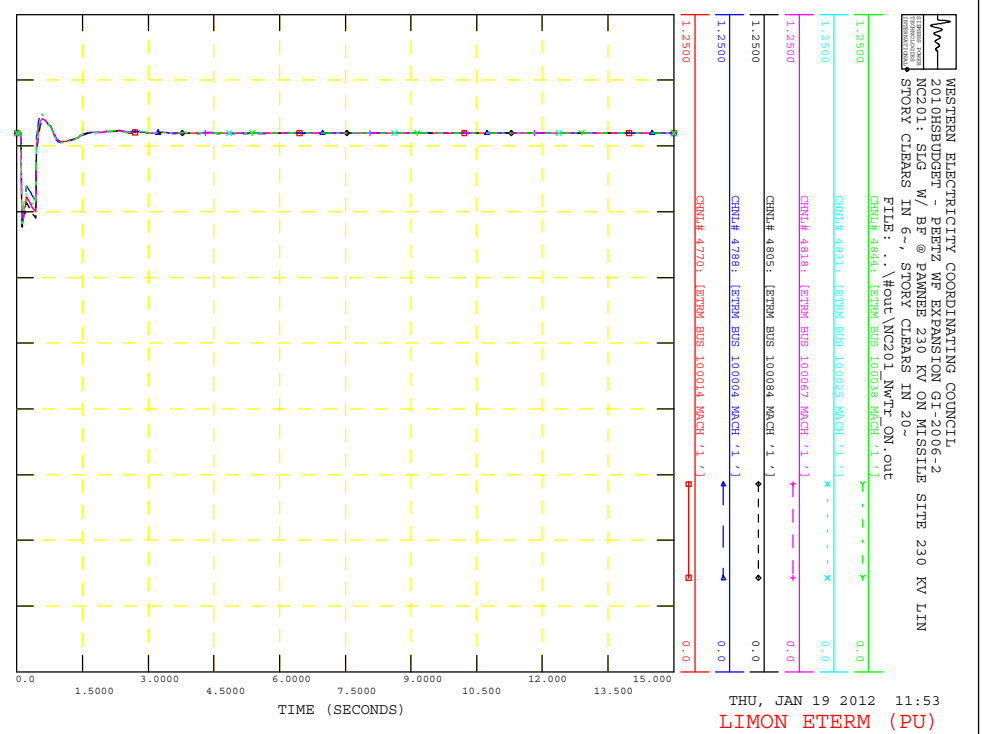
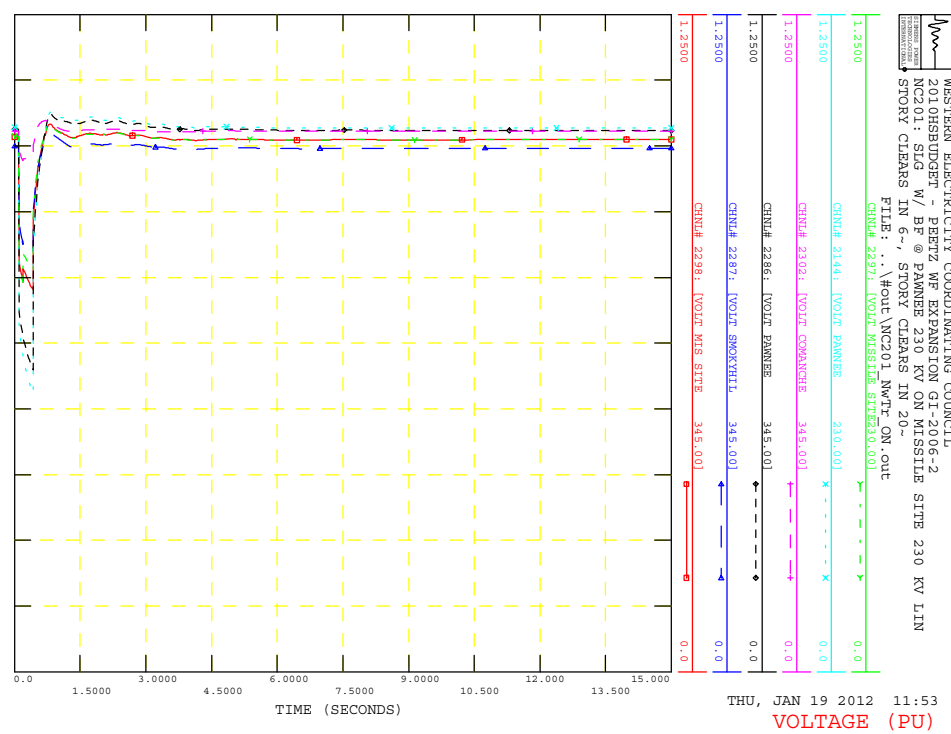


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_mwTr_0N.out

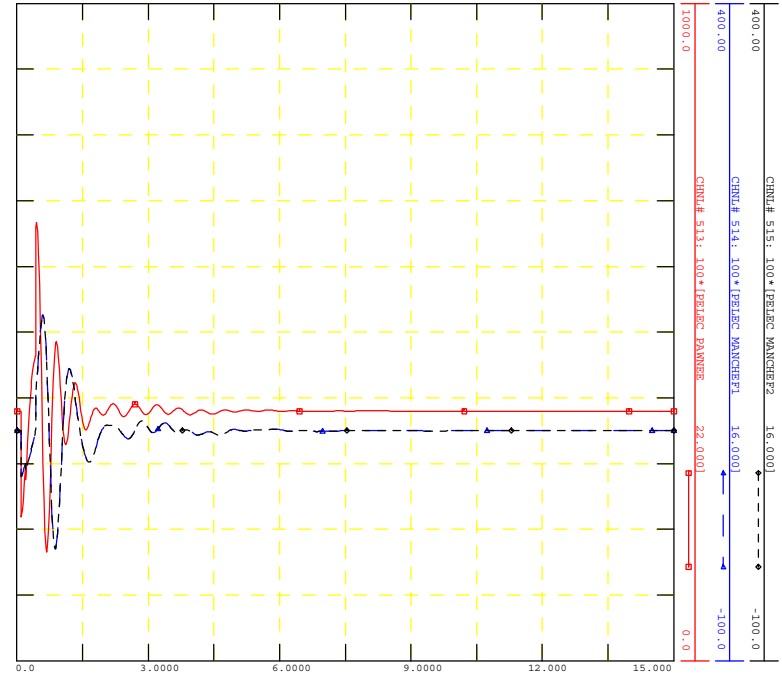


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC200: SLG W/ BF @ PANMER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6-, MISSILE SITE CLEARS IN 20-
 FILE: ..\Hour\NC200_mwTr_0N.out



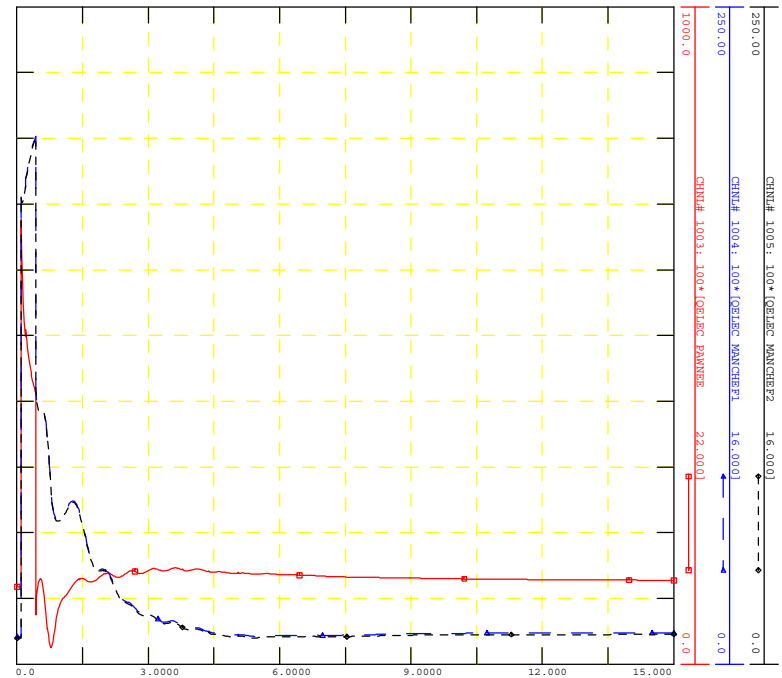


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_mwTr_0N.out



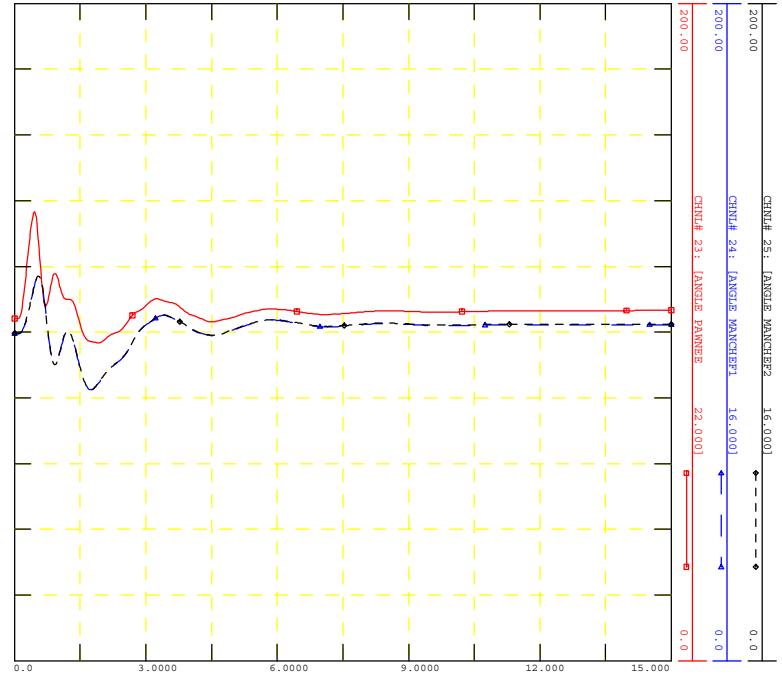
THU, JAN 19 2012 11:53
 PWNEE & MNCHF, PELEC (MW)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_mwTr_0N.out



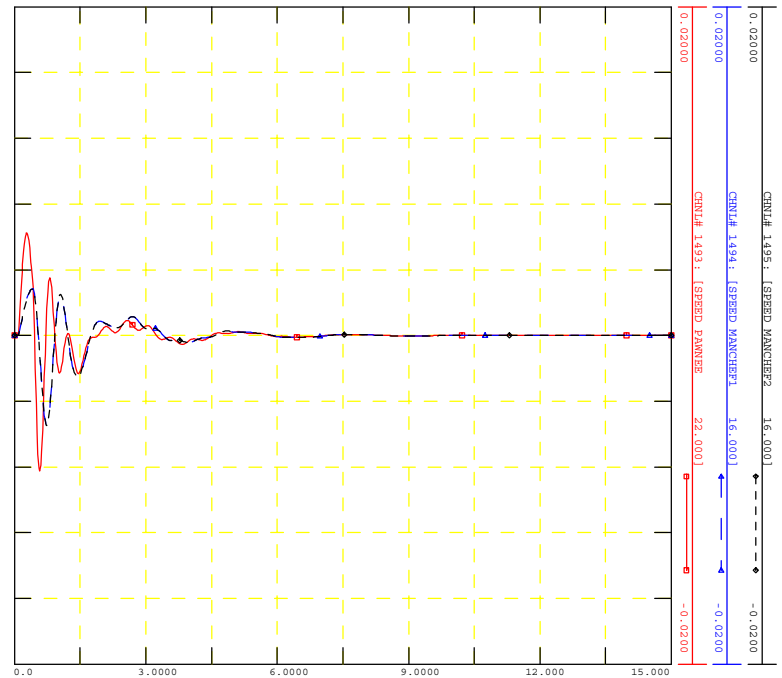
THU, JAN 19 2012 11:53
 PWNEE & MNCHF, QELEC (MVAR)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_mwTr_0N.out



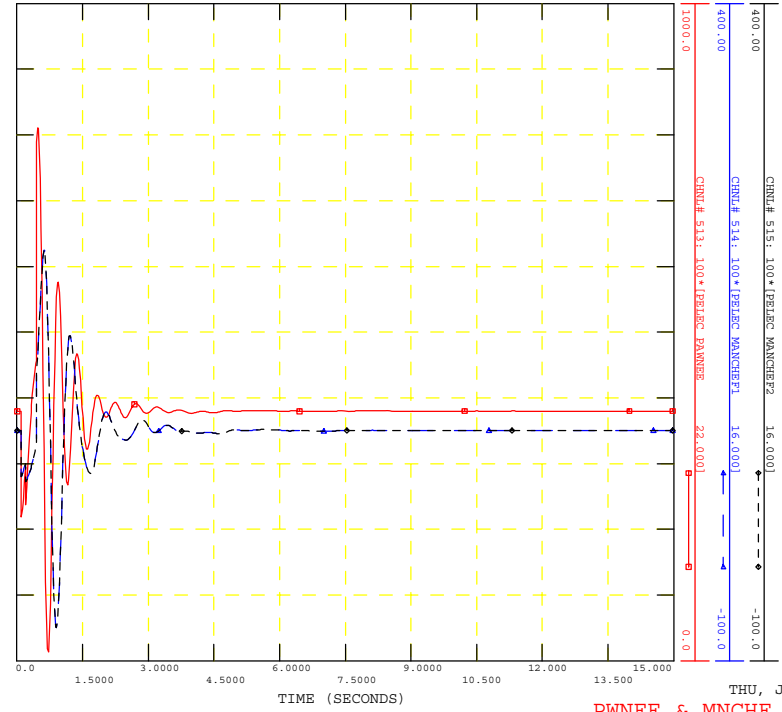
THU, JAN 19 2012 11:53
 PWNEE & MNCHF, ANGLE (DEG)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC201: SLG W/ BF @ PANNER 230 KV ON MISSILE SITE 230 KV LIN
 STORY CLEARS IN 6', STORY CLEARS IN 20-
 FILE: ..\Hour\NC201_mwTr_0N.out

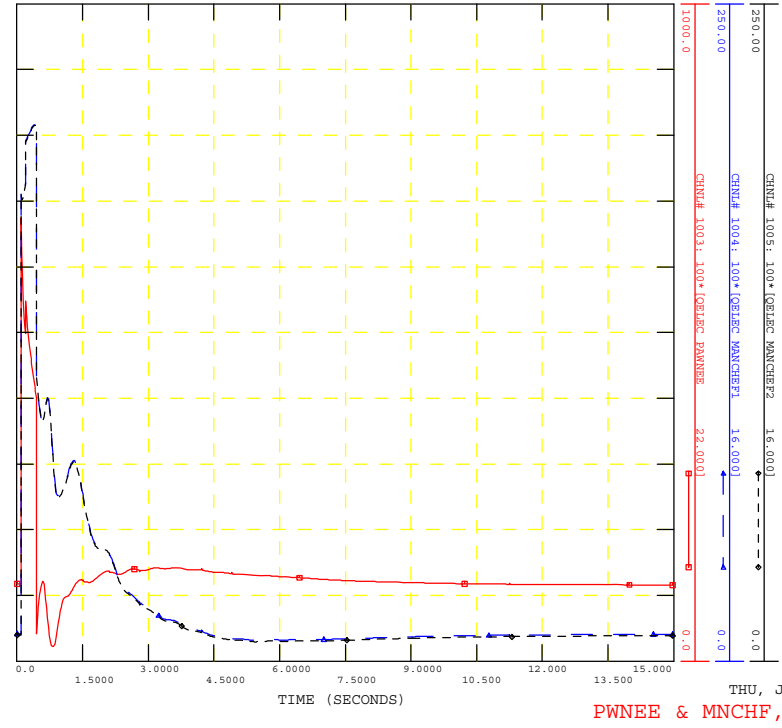


THU, JAN 19 2012 11:53
 PWNEE & MNCHF, SPDEV (PU)

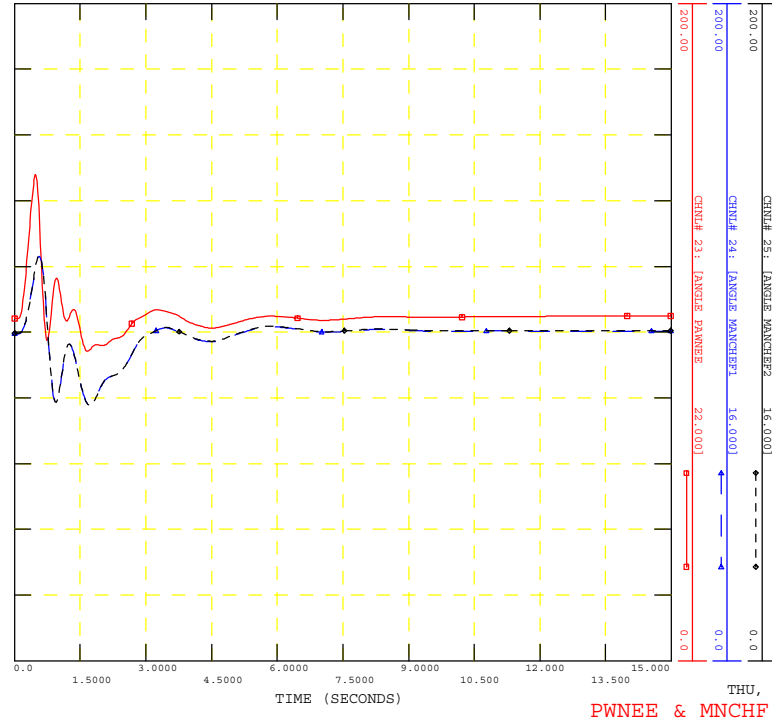
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_mwTr_0N.out



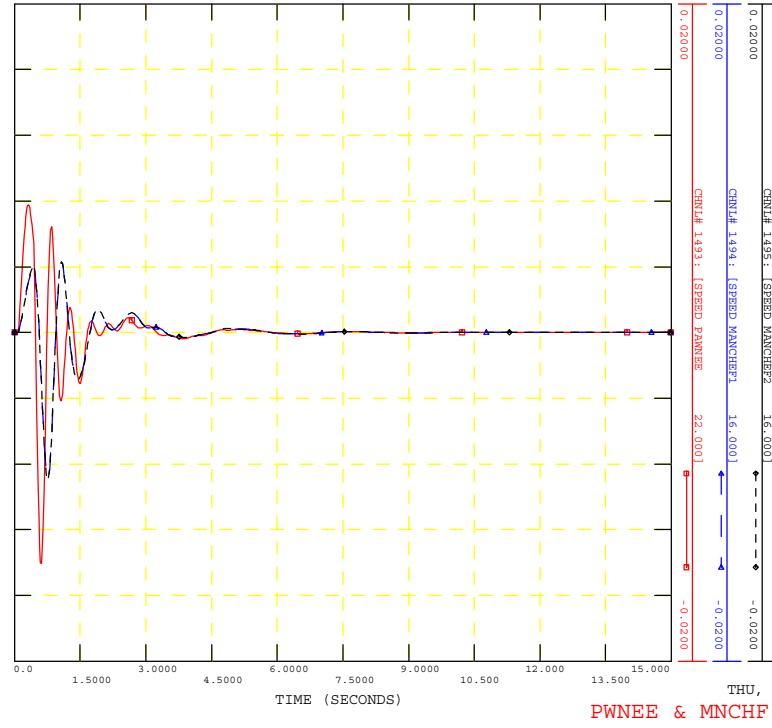
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_mwTr_0N.out

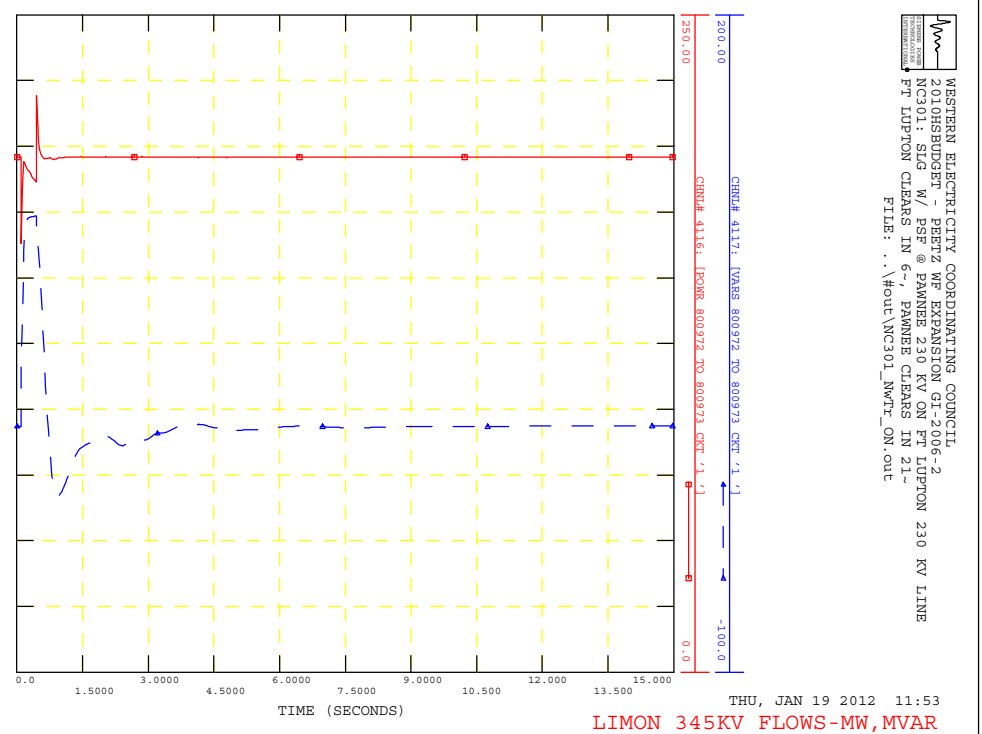
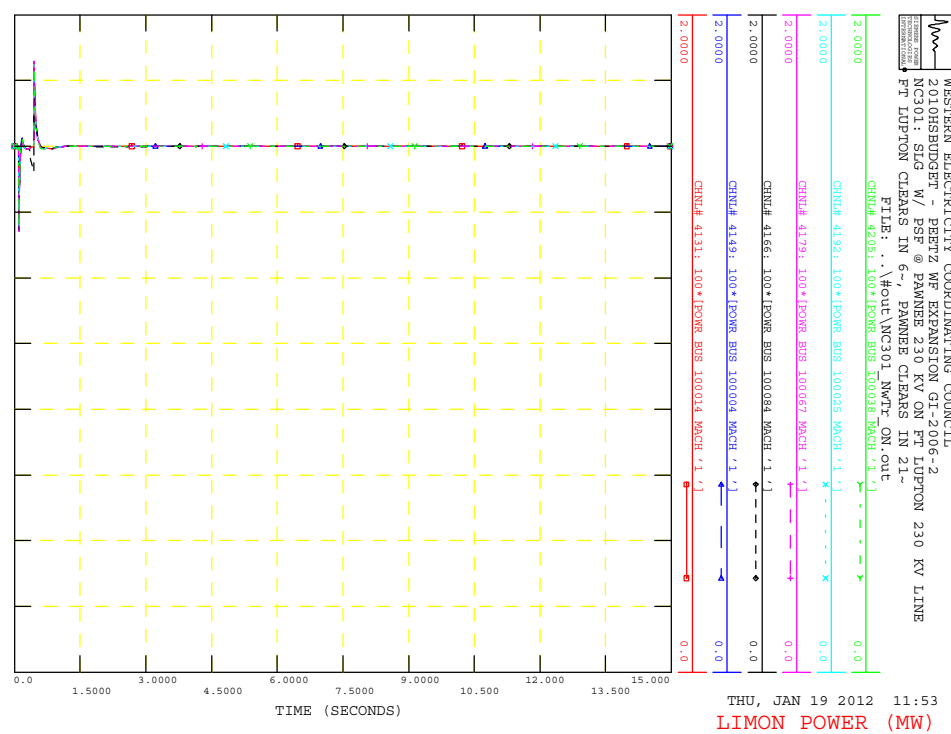
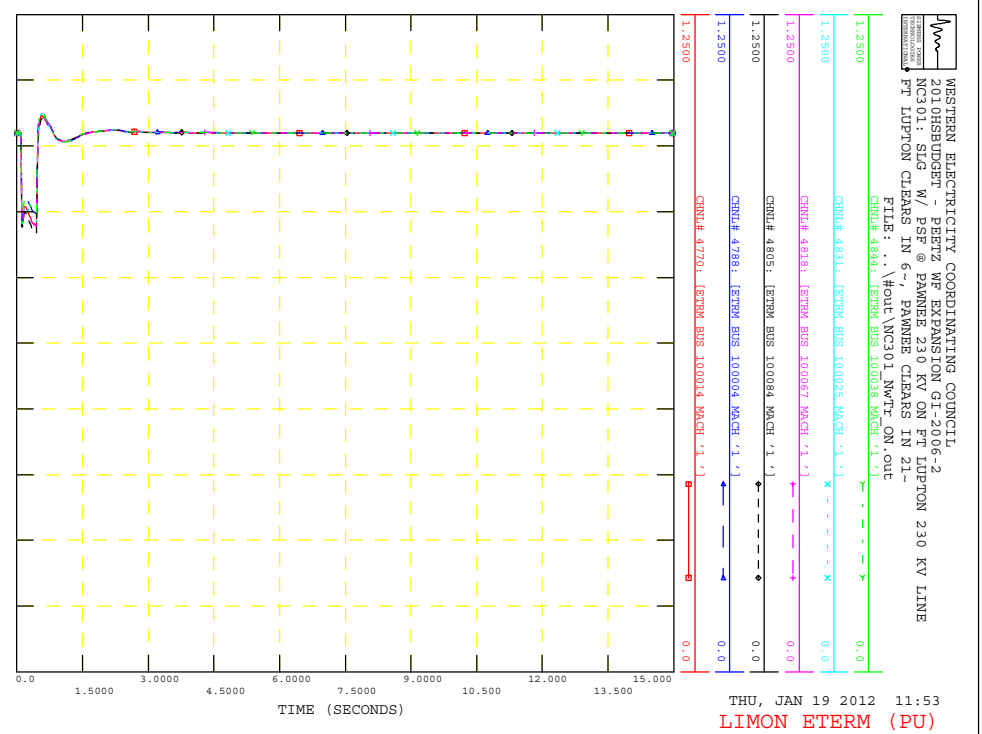
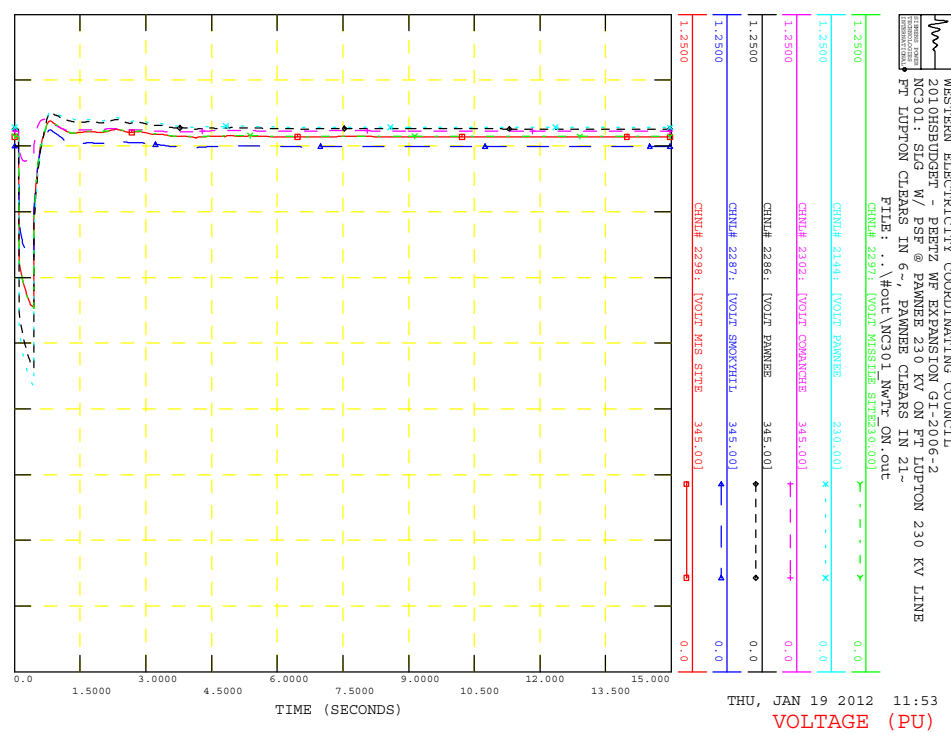


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_mwTr_0N.out

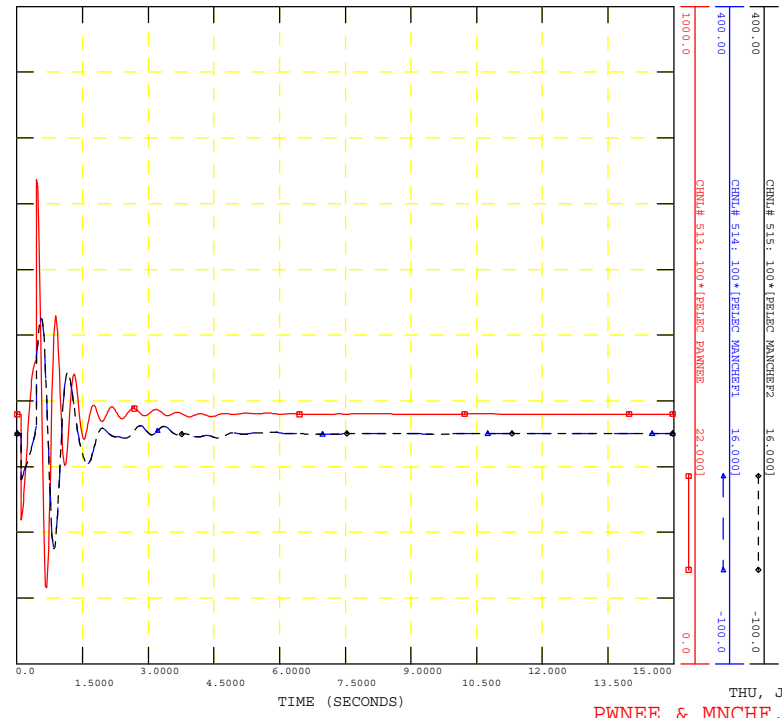


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PEETZ WF EXPANSION GI-2006-2
 NC300: SLG W/ PSF @ PANNER 230 KV ON STORY 230 KV LINE
 STORY CLEARS IN 6", PANNER CLEARS IN 21"
 FILE: ..\Hour\NC300_mwTr_0N.out

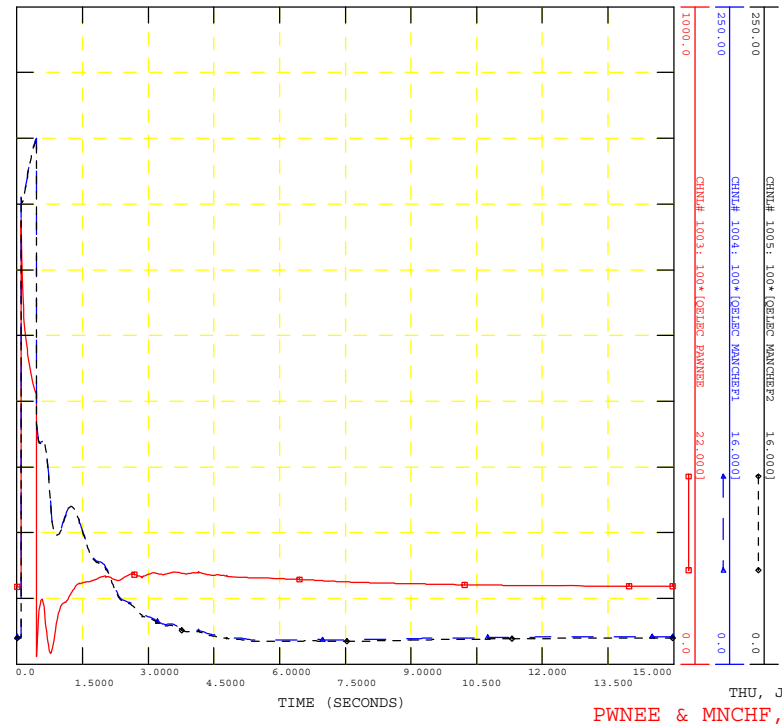




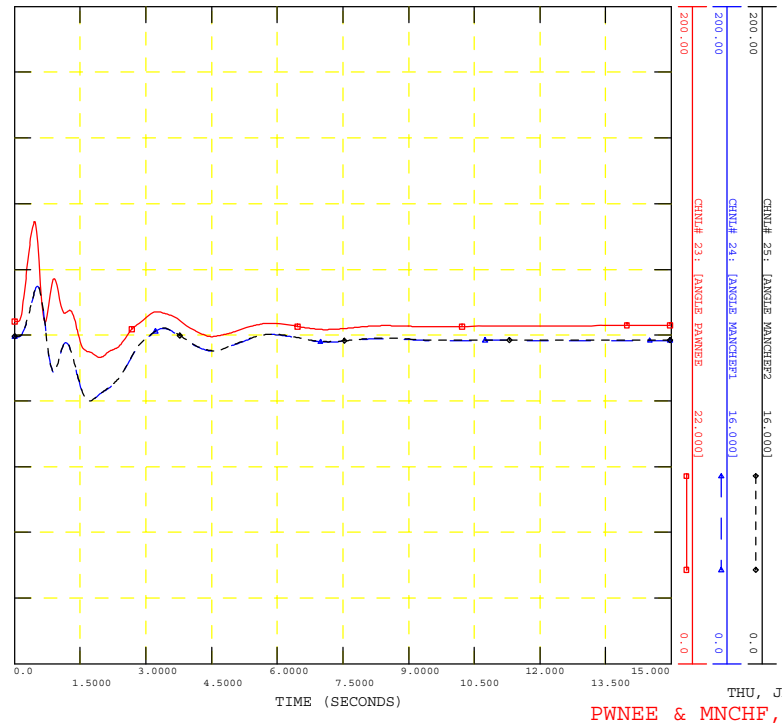
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PANMEE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PANMEE CLEARS IN 21"
 FILE: ..\#out\NC301_mwTr_0N.out



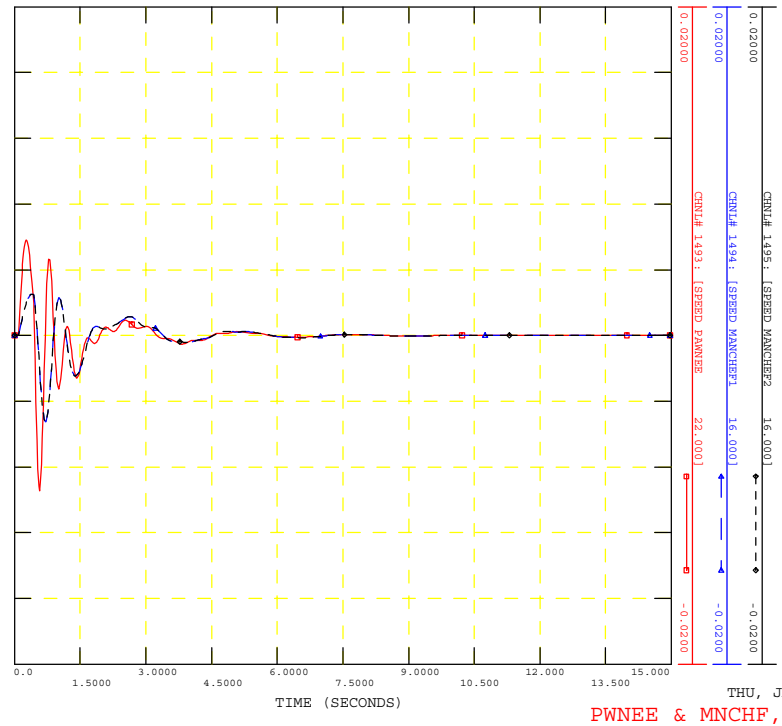
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PANMEE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PANMEE CLEARS IN 21"
 FILE: ..\#out\NC301_mwTr_0N.out

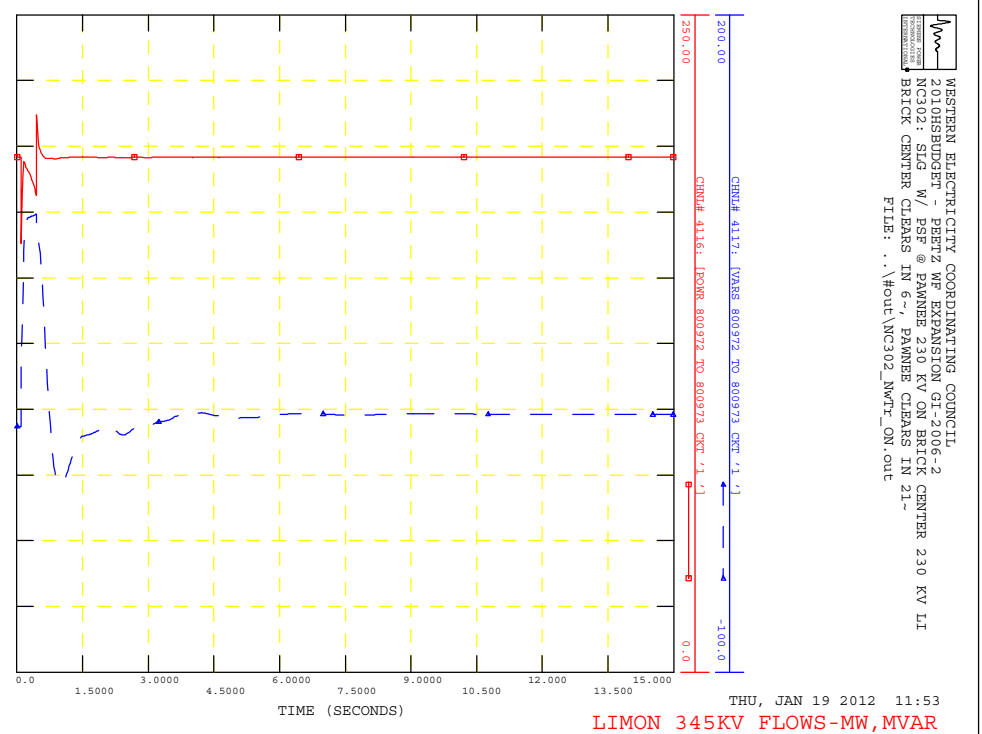
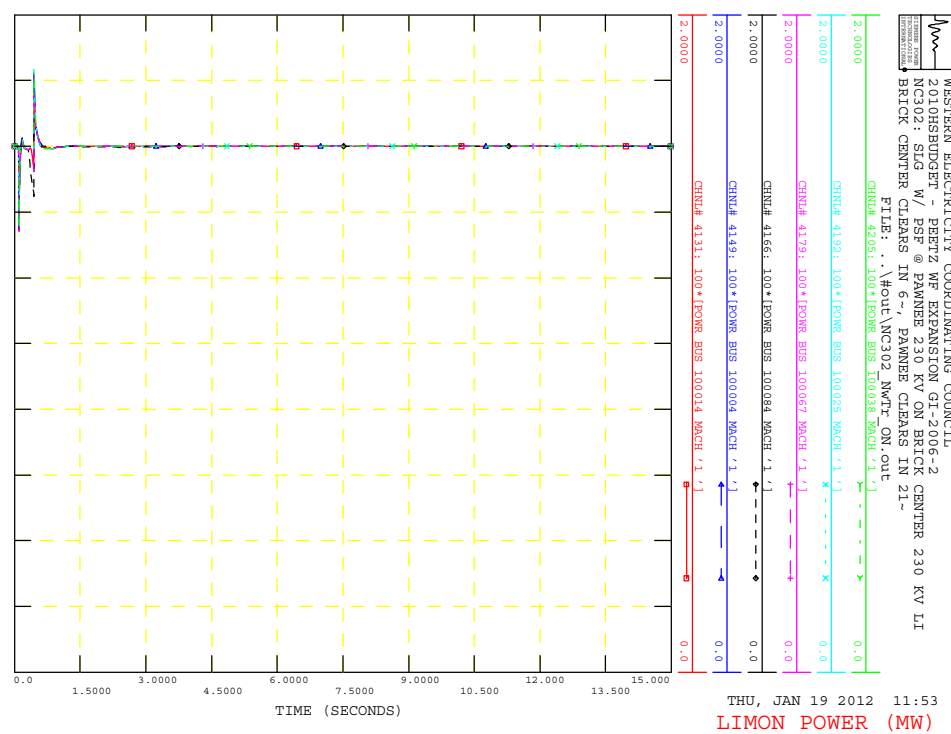
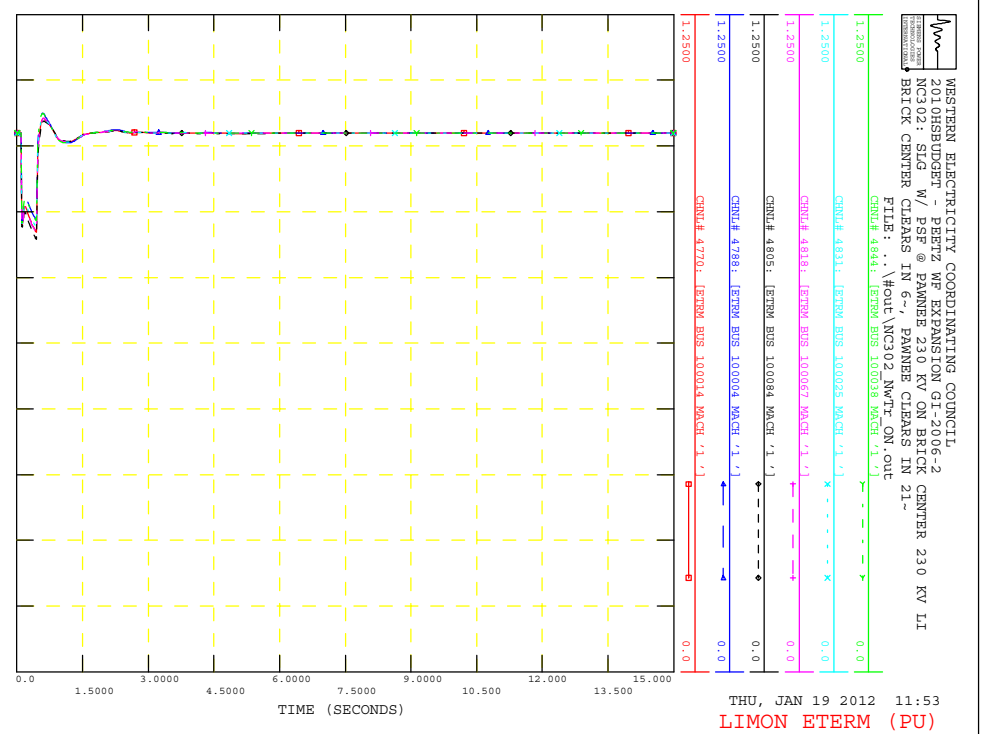
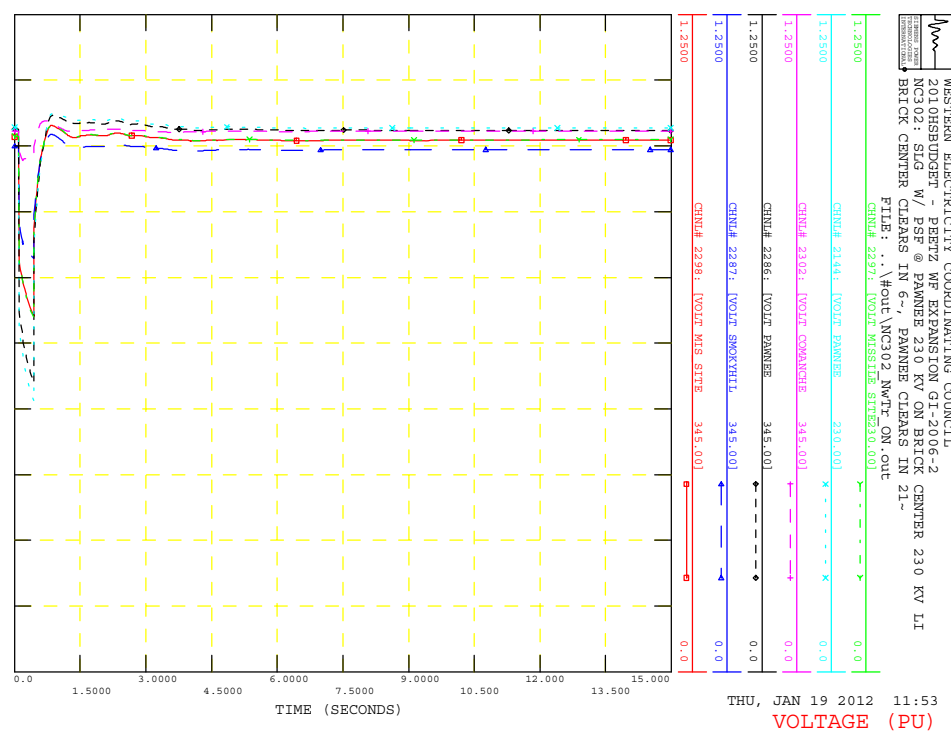


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PANMEE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PANMEE CLEARS IN 21"
 FILE: ..\#out\NC301_mwTr_0N.out

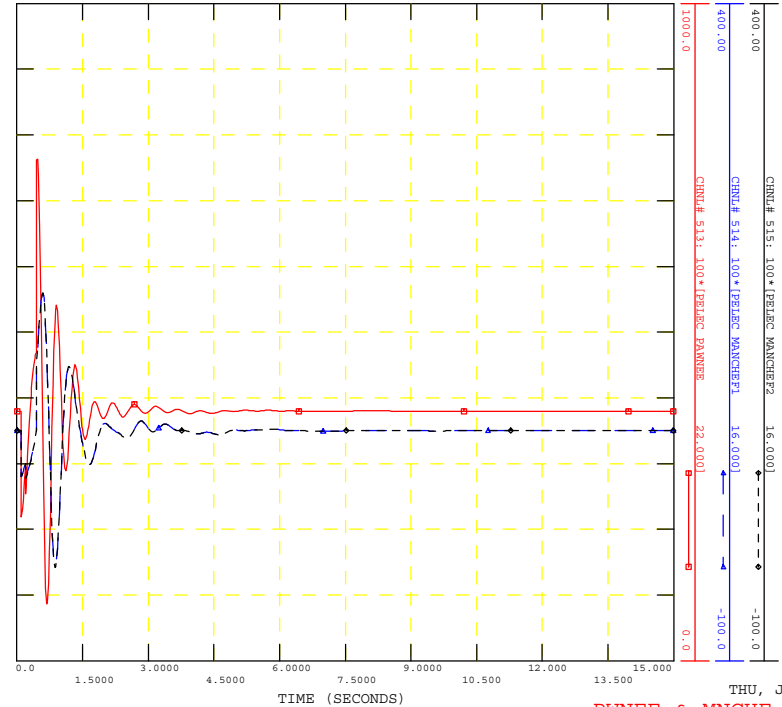


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION GI-2006-2
 NC301: SLG W/ PSF @ PANMEE 230 KV ON FT LUPPON 230 KV LINE
 FT LUPPON CLEARS IN 6", PANMEE CLEARS IN 21"
 FILE: ..\#out\NC301_mwTr_0N.out



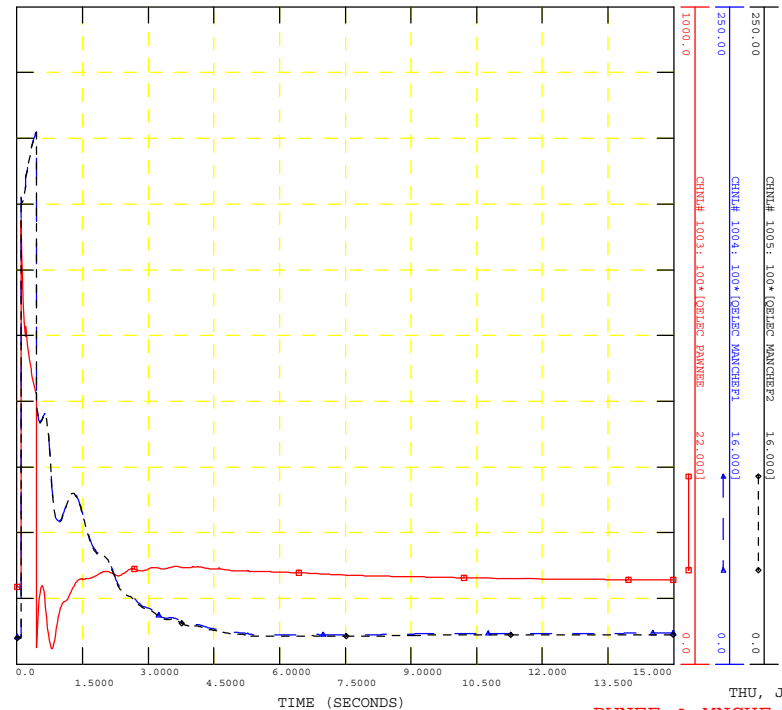


WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION G1-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_mwTr_0N.out



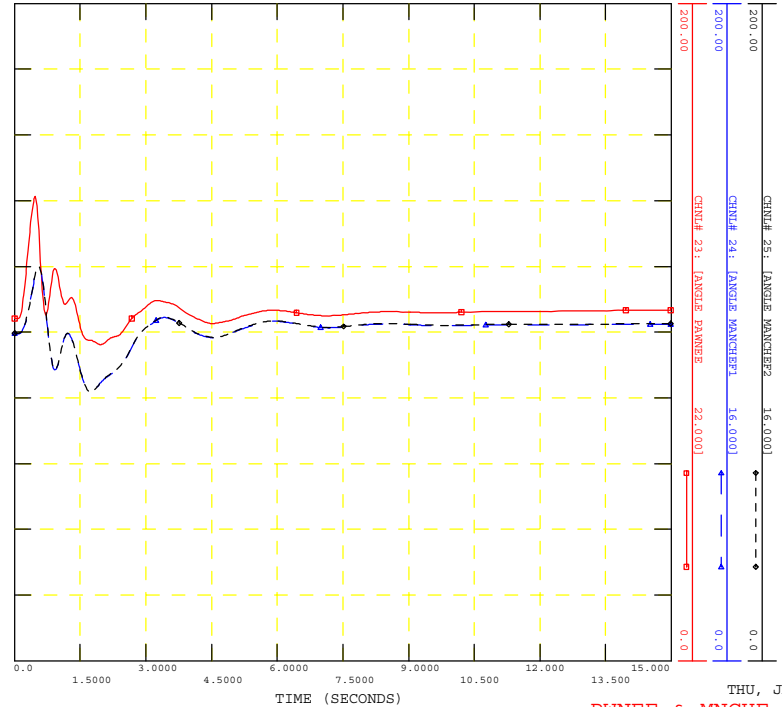
THU, JAN 19 2012 11:53
PWNEE & MNCHF, PELEC (MW)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION G1-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_mwTr_0N.out



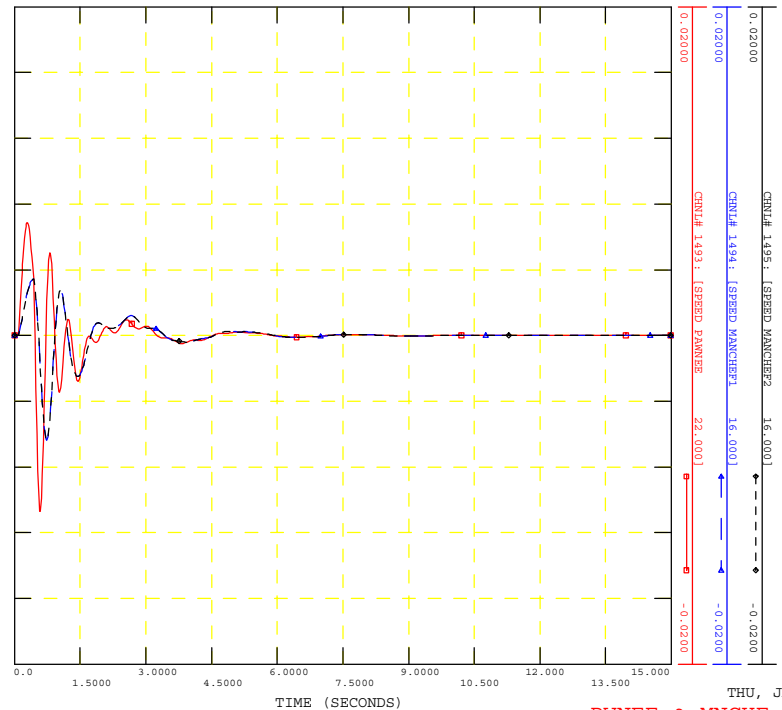
THU, JAN 19 2012 11:53
PWNEE & MNCHF, QELEC (MVAR)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION G1-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_mwTr_0N.out



THU, JAN 19 2012 11:53
PWNEE & MNCHF, ANGLE (DEG)

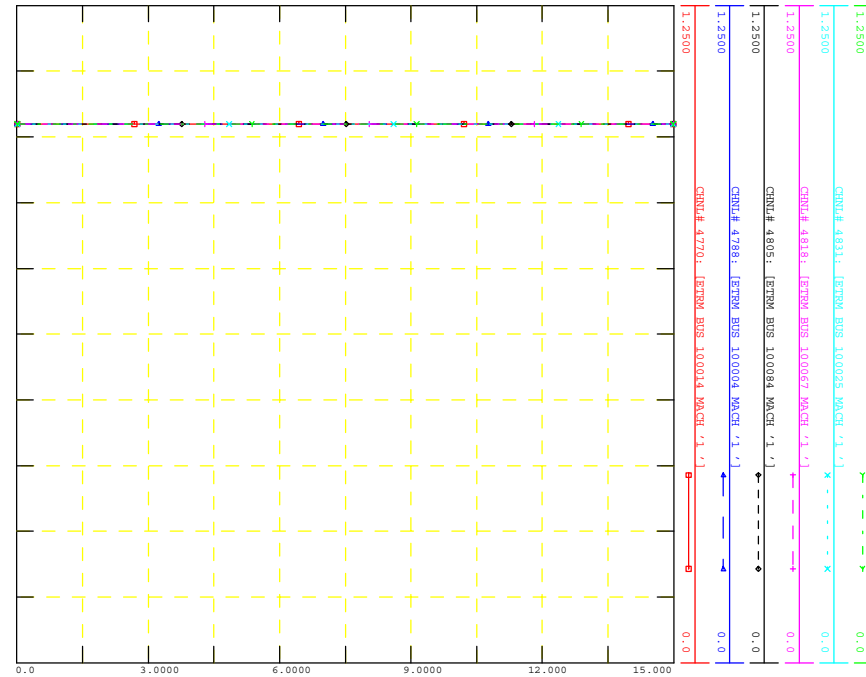
WESTERN ELECTRICITY COORDINATING COUNCIL
 2010SBUDGET - PERTZ WF EXPANSION G1-2006-2
 NC302: SLG W/ PSF @ PANNEE 230 KV ON BRICK CENTER 230 KV LI
 BRICK CENTER CLEARS IN 6~, PANNEE CLEARS IN 21~
 FILE: ..\Hour\NC302_mwTr_0N.out



THU, JAN 19 2012 11:53
PWNEE & MNCHF, SPDDEV (PU)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT

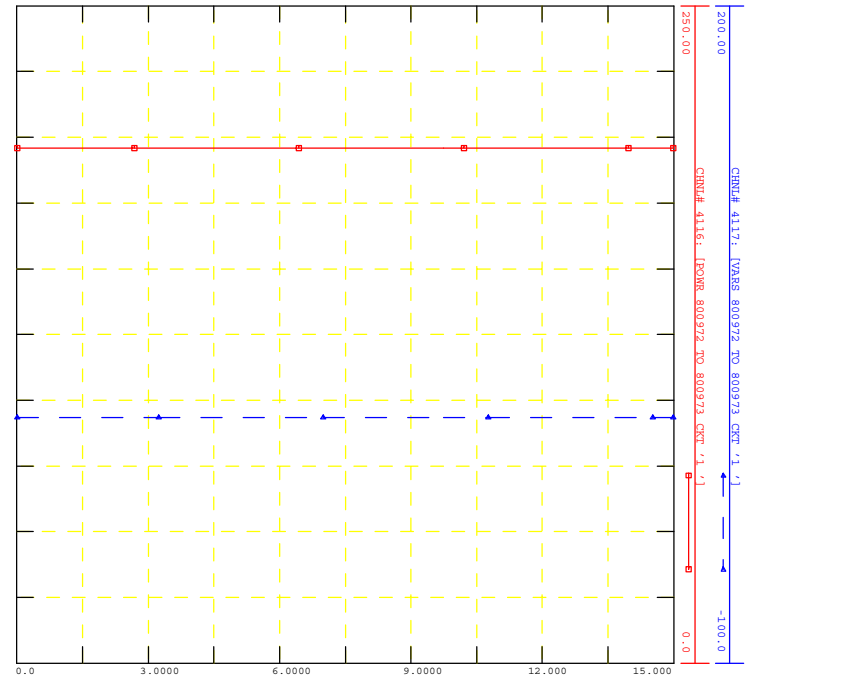
FILE: ..\#out\FLAT_MWTr_ON.out



THU, JAN 19 2012 11:53
LIMON ETERM (PU)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT

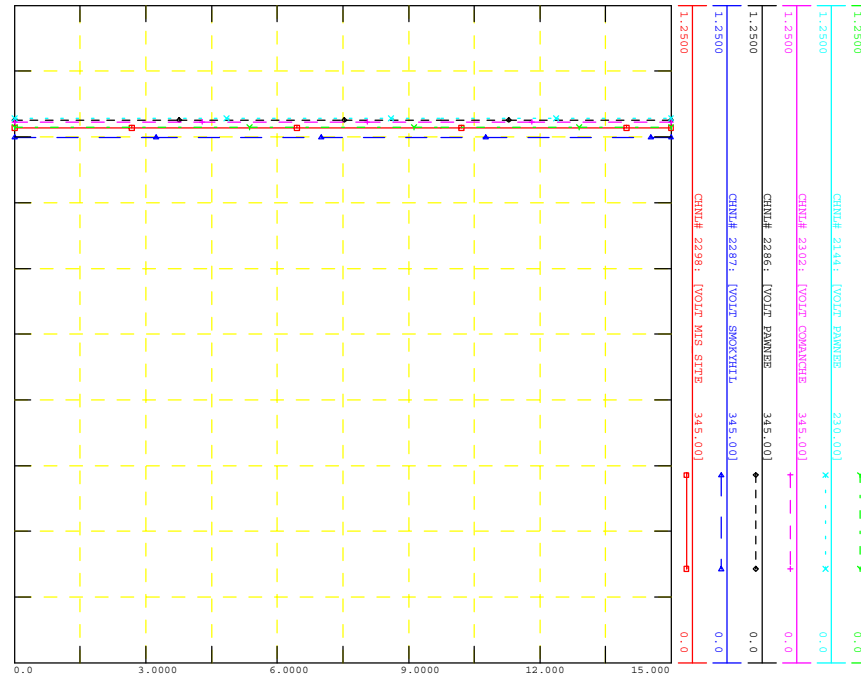
FILE: ..\#out\FLAT_MWTr_ON.out



THU, JAN 19 2012 11:53
LIMON 345KV FLOWS-MW, MVAR

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT

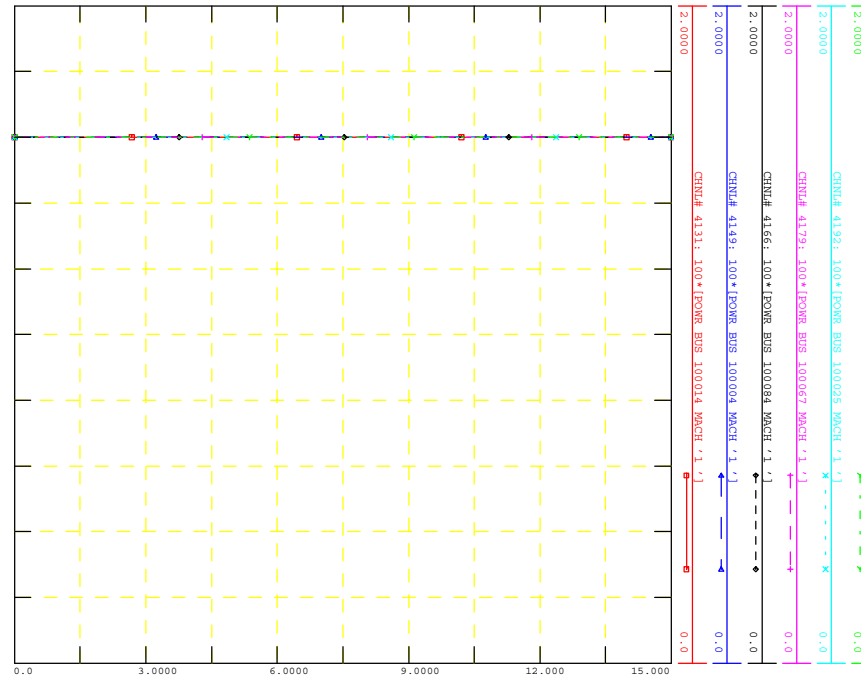
FILE: ..\#out\FLAT_MWTr_ON.out



THU, JAN 19 2012 11:53
LIMON POWER (MW)

WESTERN ELECTRICITY COORDINATING COUNCIL
 2010HSBUDGET - PERTZ WF EXPANSION GI-2006-2
 FLAT: FLAT RUN, NO FAULT

FILE: ..\#out\FLAT_MWTr_ON.out



THU, JAN 19 2012 11:53
LIMON POWER (MW)

